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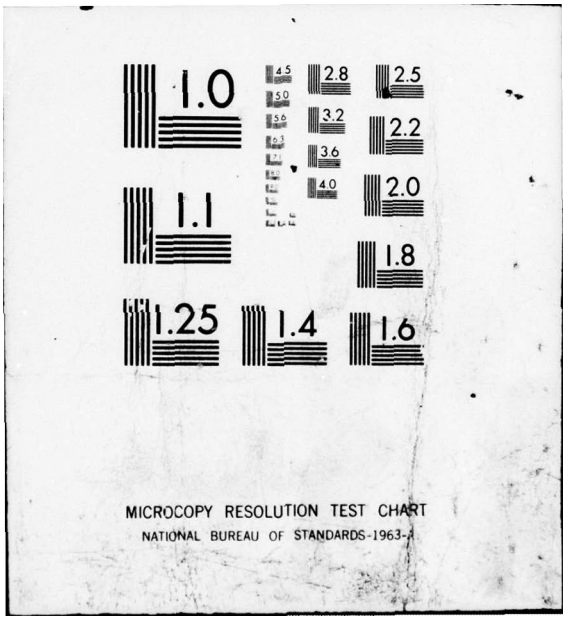
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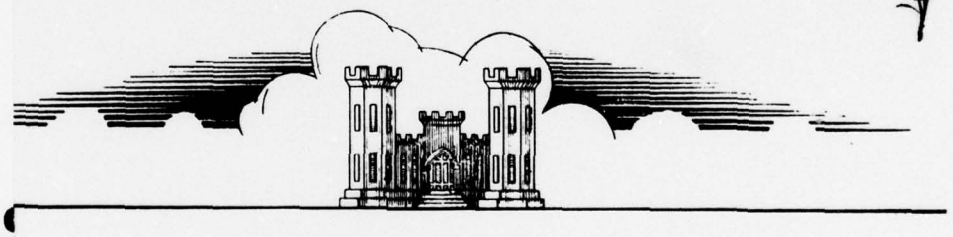
LEVEL II

MOHAWK RIVER WATERSHED
PECK CREEK BASIN

PECK LAKE DAM
FULTON COUNTY, NEW YORK

NY 166
PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



Prepared by
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For

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

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DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, NEW YORK
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

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NANEN-F

Honorable Hugh L. Carey
Governor of New York
Albany, New York 12224

Dear Governor Carey:

The purpose of this letter is to inform you of a clarification of the guidelines used by this office in assessing dams under the National Program of Inspection of Dams.

Office of the Chief of Engineers has recently provided a clarification that dams with seriously inadequate spillways are to be assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The following dams in your state have previously been assessed as having seriously inadequate spillways, with capability to pass safely only the percentage of the probable maximum flood as noted in each report. They are now to be assessed as unsafe:

I.D. NO.	NAME OF DAM
N.Y. 59	Lower Warwick Reservoir Dam
N.Y. 4	Salisbury Mills Dam
N.Y. 45	Amawalk Dam
N.Y. 418	Jamesville Dam
N.Y. 685	Colliersville Dam
N.Y. 6	Delta Dam
N.Y. 421	Oneida City Dam
N.Y. 39	Croton Falls Dam
N.Y. 509	Chadwick Dam (Plattenkill)
N.Y. 66	Boyds Corner Dam
N.Y. 397	Cranberry Lake Dam
N.Y. 708	Seneca Falls Dam
N.Y. 332	Lake Sebago Dam
N.Y. 338	Indian Brook Dam
N.Y. 33	Lower(S) Wiccopee Dam (Lower Hudson W.S. for Peekskill)

NANEN-F
Honorable Hugh L. Carey

I.D. NO.	NAME OF DAM
N.Y. 49	Pocantico Dam
N.Y. 445	Attica Dam
N.Y. 658	Cork Center Dam
N.Y. 153	Jackson Creek Dam
N.Y. 172	Lake Algonquin Dam
N.Y. 318	Sixth Lake Dam
N.Y. 13	Butlet Storage Dam
N.Y. 90	Putnam Lake (Bog Brook Dam)
N.Y. 166	Pecks Lake Dam
N.Y. 674	Bradford Dam
N.Y. 75	Sturgeon Pool Dam
N.Y. 414	Skaneateles Dam
N.Y. 155	Indian Lake Dam
N.Y. 472	Newton Falls Dam
N.Y. 362	Buckhorn Lake Dam

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam.

Consequently, it is advisable to implement the recommendations previously furnished in the reports for the above-mentioned dams as soon as practicable.

It is requested that owners of these dams be furnished a copy of this letter and that copies be permanently appended to all reports previously furnished to you.

Sincerely yours,

CLARK H. BENN
Colonel, Corps of Engineers
District Engineer

MOHAWK RIVER WATERSHED
PECK CREEK BASIN
FULTON COUNTY, NEW YORK.

(6) National Dam Safety Inspection Program.

PECK LAKE DAM
NIAGARA MOHAWK POWER CORPORATION, NEW YORK
(NDS # NY 166)
(NYSDEC # 172-435)

PHASE I INSPECTION REPORT,
NATIONAL DAM SAFETY INSPECTION PROGRAM

Prepared by

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91 Roseland Avenue, P. O. Box 91
Caldwell, New Jersey 07006

(10) Gary S. Salzman

(12) 119 p.

For

DEPARTMENT OF THE ARMY
New York District, Corps of Engineers
26 Federal Plaza
New York, New York 10007

(15) DACW51-78-C-0135

(11) 25 September 1978

393 970

TABLE OF CONTENTS

PLATES

APPENDICES

PHASE I REPORT

NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam: Peck Lake Dam

Owner: The Peck family. Under a 999 year lease, the Niagara Mohawk Power Corporation operates and maintains dam.

State Located: New York

County Located: Fulton

Stream: Peck Creek

Date of Inspection: 30 July 1978 and 13 August 1978

Inspection Team: Converse Ward Davis Dixon
91 Roseland Avenue, P. O. Box 91
Caldwell, New Jersey 07006

and

Lev Zetlin Associates, Inc.
95 Madison Avenue
New York, New York 10016

Visual inspection of the Peck Lake Dam did not reveal any signs of immediately imminent structural instability at this time, although extensive deterioration of the concrete and occurrence of minor to moderate amount of seepage throughout the dam was noticed. Continued seepage could lead to even more serious deterioration of the concrete and eventually cause failure. Based on the stability analysis performed for this study, the subject dam was found to be either unsafe or marginally safe for the two conditions of loadings considered (refer to Section 6 for details). In view of this, a more detailed investigation and re-evaluation of the stability analysis is required. Necessary remedial measures may then be taken.

Until such time as remedial measures are taken, the present practice of lowering the water level during winter should be invariably continued. Additionally, during the rest of the year the pool level should be maintained at minimum permissible level, and the pool monitored during periods of heavy precipitation to ensure that a low level is maintained. Overtopping of the spillway by more than a few inches should not be allowed, or the stability of the dam may be endangered.

Our hydrologic and hydraulic computations indicate that the overflow spillway cannot pass the Probable Maximum Flood (PMF) without the dam being overtopped. Therefore, based on the screening guidelines established by the Department of Army, Office of the Chief of Engineers (OCE), the spillway capacity is rated as inadequate. In addition, the spillway is considered seriously inadequate since all the conditions established by the OCE guidelines for determining seriously inadequate spillway capacity are satisfied. Since this assessment was based on OCE screening criteria and approximate computational techniques, a detailed hydrologic and hydraulic evaluation of the watershed and gravity spillway-outlet pipes should be performed by the use of more precise and sophisticated methods and procedures. Following such an investigation, the need for, and type of, mitigating measures should be determined. Until such a study is completed and the spillway adequacy established, around-the-clock surveillance of the dam should be provided during periods of unusually heavy precipitation.

Our assessment of the general physical condition of the Peck Lake Dam has led us to make the following recommendations:

1. Appropriate steps should be taken to stop or control seepage through the dam at various locations (for specific areas, refer to Section 3).

2. All cracked, spalled and deteriorated concrete throughout the dam should be repaired (for specific areas, refer to Section 3).

3. As our computations indicate the safety of the dam is marginal, a more detailed investigation is recommended in order that the stability of the dam can be re-evaluated. Three detailed analytical investigations: uplift-stability; foundation system; and seepage under the dam, should be performed. If the dam is still found to be only marginally safe, remedial measures may be necessary, such as dowelling

the concrete gravity spillway to the rock foundation and increasing the mass of the gravity wall, etc. Until such remedial measures are taken, the lake pool level should be kept as low as practicable, as discussed earlier.

4. A major reconstruction of the dam should be planned within the next few years.

5. The overhanging trees and woody growth on both sides of the concrete dike should be cleared.

6. Stagnant water and swamp on the downstream side of the dike should be drained off by clearing the heavily overgrown vegetation.

7. Vegetation should be cleared from the spillway discharge area.

8. An emergency warning system should be formulated and officially presented to local police authorities as soon as possible, preferably within one calendar year.

9. A specific program for normal operation of the dam should be formulated and followed.

10. A specific program for periodic maintenance of the dam and its operating equipment should be established and implemented.

Items 1, 2, 3, 7, 8, 9 and 10 should be preferably completed within one year, and Items 5 and 6 should be implemented as soon as practicable, certainly within the next three years.

Respectfully submitted,

CONVERSE WARD DAVIS DIXON

Gary S. Salzman, P.E.

LICENSED PROFESSIONAL ENGINEER
GARY S. SALZMAN
No. 40045
UNIVERSITY STATE OF NEW YORK

Date: 25 September 1978

Approved by:

Colonel Clark H. Benn
New York District Engineer

Date: 28 September 1978

OVERVIEW - ACROSS LAKE, PECK LAKE DAM

OVERVIEW - FROM DOWNSTREAM FACE, PECK LAKE DAM

SECTION

PROJECT INFORMATION

1.1 General

a. Authority

The authority to conduct this Phase I inspection and evaluation comes from the National Dam Inspection Act (P.L. 92-367) of 1972 in which the Secretary of the Army was authorized to initiate, through the Corps of Engineers, a program of safety inspections of non-federal dams throughout the United States. Management and execution of the program within the State of New York has been undertaken by the New York State Department of Environmental Conservation (NYSDEC).

b. Purpose

The primary purpose of the inspection is to evaluate available data and to give an opinion as to whether the subject dam constitutes a hazard to human life and/or property.

1.2 Description of Project

a. Description of Dam and Appurtenances

The Peck Lake Dam was built in 1910-1911 and is located at the south end of Peck Lake. It is a 600-foot long buttressed arch dam, with approximately a 120-foot long concrete gravity spillway on its right (inspection drawings dated 8-1-68, 6-10-70, 9-10-70 and 10-10-70 presented in Appendix E). To the right of the spillway is a concrete dike approximately 312 feet long, followed by a 350±-foot long earth dike. Some of these lengths differ from those shown on the original drawing of November 1910 (Plate II). The top of the dam, the gravity wall, and the dikes are at elevation 1383 feet, whereas the crest of the spillway is at elevation 1380 feet.

The height of the arch dam is greatest near its right abutment, and is about 39 feet above original ground level at Arch No. 1. (Arch No. 1 is immediately left of the spillway; Arches 2 through 10 number consecutively to the left of Arch No. 1.) The original ground surface rises from elevation 1344± at Arch No. 1 to elevation 1372± at the left end of Arch No. 10. The depth of embedment of the arch and buttress foundations varies as

shown on Plate II. The base width of the buttresses decreases from right to left due to the rise in ground surface. The arches are 2 feet wide at the top and they have a batter of 3/16 inch per foot on both sides. The buttresses are 3 feet wide at the top and are battered at 5/8 inch per foot on both sides. Starting at the arches, the height of the buttresses decreases in the downstream direction at a slope of 4 horizontal to 3 vertical except in the case of the buttress between Arches 2 and 3, which slopes at 5 horizontal to 3 vertical.

The gravity spillway is located to the right of the arch dam and is founded on rock which is exposed on the downstream side. Since the rock surface slopes down from right to left, the height of the gravity spillway increases in the same direction. The crest of the spillway is 4 feet wide, and its downstream face slope is 8 horizontal on 12 vertical.

The concrete gravity wall to the left of the arch dam has a vertical upstream face, and the downstream face is inclined at 1 horizontal to 2 vertical. Its crest width is 3 feet. The concrete dike to the right of the gravity spillway has a 2-foot wide crest, a vertical upstream face, and downstream face inclined at 1 horizontal to 2 vertical.

There are two 36-inch diameter steel outlet pipes located in Arch No. 1. The invert of the two pipes is at elevation 1345 feet. Flow through these pipes is controlled by two gate valves in the gate house, which is located at the base of Arch No. 1 on the downstream side. The gate house is apparently founded on rock, and its access is across a wooden walkway from the road at the toe of the dam. On the upstream side, there is an intake structure (Plates IV, V and VI) with an emergency chain and flap gate closure arrangement.

b. Location

The dam is located on Peck Creek about 5 miles northwest of the Town of Gloversville, in Fulton County, New York. The location of the dam is shown on Plate I, which was reproduced from the USGS 7.5 minute Quadrangle Sheet of Peck Lake, N.Y., N43°00'00", W74°22'30".

c. Size Classification

The dam is classified as "intermediate" (storage = 23,170 acre-feet; height = 39 feet).

d. Hazard Classification

Because there are two houses immediately downstream of the gravity and buttress section of the dam, the hazard classification for the subject structure is considered "high".

e. Ownership

The Peck family, with the Niagara Mohawk Power Corporation (NMPC), Syracuse, New York, having a 999-year lease. The NMPC has the responsibility of operation and maintenance of the dam.

f. Purpose

The primary purpose of the dam is to create a storage reservoir for the generation of electricity farther downstream at Ephratah power house. This is one of several dams built under Ephratah development (Refer to "Ephratah Development", general location plan in Appendix E). The secondary use of the reservoir is for recreation purposes.

g. Design and Construction History

The dam was designed for Mohawk Hydroelectric Company in 1910 by the firm of Wm. Barclay Parsons, Consulting Engineers, 60 Wall Street, New York. The original design drawings are presented as Plates II through VI in this report.

This dam has undergone major repairs in 1970 (Arches 1 through 10?), 1976 (Arches 5 through 10) and 1977 (Arches 1 through 4 and spillway). The lake level was lowered 18 to 20 feet in 1970 and 1976. Many photos of all repairs are available at NMPC offices. Repairs predating 1970 probably occurred through the years.

h. Normal Operational Procedure

There are apparently no formal operational procedures. However, the deed restriction does not permit lowering the reservoir water level below the spillway crest any more than 2 feet between Memorial Day and Labor Day, but we were informed at the site that the water level in the reservoir has to be maintained within 3 feet of the spillway crest in that time period. To avoid freezing of the downstream channel in winter, a continuous flow of water is maintained. Depending on the snow cover, the lake level is intentionally drawn down 10 to 14 feet by spring to accommodate the anticipated runoff.

1.3 Pertinent Data

a. Drainage Area

The drainage area of Peck Lake is approximately 19 square miles. This was obtained for this study from USGS Quadrangle maps, by the use of a planimeter.

b. Discharge at Damsite

Maximum known flood at damsite: High water mark of 6 inches above the spillway crest corresponds to approximately 280 cfs with both gates closed, or 970 cfs with both gates fully open (Appendix C).

Spillway discharge: 4100 cfs (with 3 feet of water over spillway crest. Refer to Appendix C.)

c. Elevations (feet above MSL)

Top of dam: 1383.0.

Maximum pool (top of dam): 1383.0.

Normal pool (spillway crest): 1380.0. Often maintained lower.

Invert of 36-inch outlet pipes: 1345.0.

d. Reservoir

Length of normal (spillway crest) pool: 3½ miles (measured from USGS Quadrangle Map).

Length of maximum pool: 3½ miles.

e. Storage (acre-feet)

Normal pool (spillway crest): 23,170.

Maximum pool (top of dam): 27,250.

The above measurements are from elevation - volume and kilowatt hour curves in Appendix E.

f. Reservoir Surface (acres)

Normal pool (spillway crest): 1410 (measured from USGS Quadrangle Map).

Maximum pool (top of dam): 1410+.

g. Arch Dam

Type: Buttressed arch; ten arches, each spanning 60 feet, separate a 120-foot long concrete gravity dam on the left and a 200-foot long concrete gravity spillway on the right.

Length: 920 feet (including the left gravity dam and the right gravity spillway) plus concrete dike and earth dike (Items j and k below).

Height: 39 feet (maximum).

Top width: Arches: 2 feet.
Buttresses: 3 feet.

Batter: Arches: 3/16 inch per foot on both sides.
Buttresses: 5/8 inch per foot on both sides.

Downstream slope: Buttresses: 4 horizontal to 3 vertical except Buttress No. 2 which slopes at 5 horizontal to 3 vertical.

Embedment (based on drawings):

Buttress on extreme right: Placed directly on rock. Very little embedment, if any.

Buttress between Arches 1 and 2: Total 10 feet, 7 feet in soil and 3 feet in rock.

Buttress between Arches 2 and 3: Approximately 16 feet in soil.

Buttresses between Arches 3, 4, 5 and 6: 9 feet in soil at the upstream end and minimum of 4 feet in soil at the downstream end.

Buttresses between Arches 6, 7, 8 and 9: 8 feet in soil at upstream end and minimum of 4 feet in soil at the downstream end.

Buttresses between Arches 9 and 10: 7 feet in soil at the upstream end and minimum of 4 feet in soil at the downstream end.

Buttress on extreme left: 6 feet in soil at the upstream end and minimum of 4 feet in soil at the downstream end.

Arches 1 through 10: 6 to 9 feet in hardpan or equally good material.

h. Gravity Wall

Length: 154 feet as shown on November 1910 drawing (Plate II) compared to ±120 feet as shown on inspection drawings (Appendix E).

Height: Maximum approximately 11 feet; decreasing right to left.

Top width: 3 feet.

Upstream face: Vertical.

Downstream face: 1 horizontal to 2 vertical slope.

Embedment: 5 feet in hardpan.

i. Concrete Gravity Spillway

Length: 200 feet.

Height: Maximum approximately 30 feet; decreasing left to right.

Top width: 4 feet.

Upstream face: Vertical.

Downstream face: 8 horizontal to 12 vertical.

Embedment: Placed directly on exposed rock. Very little embedment, if any.

j. Concrete Dike

Length: 725 feet as shown on November 1910 drawing (Plate II) compared to ±312 feet as shown on inspection drawings (Appendix E), the latter being correct.

Height: Variable depending on the ground surface.

Top width: 2 feet.

Upstream face: Vertical.

Downstream face: 1 horizontal to 2 vertical.

Embedment: Unknown.

k. Earth Dike

Length: ±350 feet as shown on inspection drawings (Appendix E). Original 1910 drawings do not show an earthen dike, but it is mentioned on Plate II that the "Design of dike subject to modifications in the field".

Other dimensions: Not shown on drawings but presumably similar to the adjoining concrete dike.

l. Diversion and Regulating Tunnel

None.

m. Regulating Outlets

Type: Two 36-inch diameter steel pipes.

Closure: One gate valve on each of the two pipes. The gate valves are located in the gate house which is at the downstream base of Arch No. 1. There is an emergency chain and flap gate closure arrangement at the upstream ends of the pipes.

Access: The access to the gate house is across a wooden walkway from the road at the toe of the dam. The emergency chain and flap gate arrangement is worked from a platform at the top of the dam; the access to the platform is via a steel ladder along the downstream slope of the buttress between Arches 1 and 2.

SECTION 2

ENGINEERING DATA

2.1 Design

There was a limited amount of structural design data available for the subject dam and its appurtenant structures, and there was no hydraulic/hydrologic data available. The sources of the available data are:

a. Five drawings dated October through December 1910 by Wm. Barclay Parsons, Consulting Engineers, 60 Wall Street, New York, regarding the construction of the original structure, as follows:

1) General layout, profile and sections (Plate II).

2) Elevation, plan and section of the intake structure (Plate III).

3) Reinforcement details in the buttresses and arches (Plate IV).

4) General layout of intake and spillway section (Plate V).

5) Structural details of intake (Plate VI).

b. Inspection notes of September 7, 1913; July 31, 1968; June 10, 1970; September 10, 1970; and October 13, 1970 (Appendix E).

There were no structural design or hydraulic/hydrologic computations available for this structure.

2.2 Construction

There were no formal construction records available for the original construction in 1910-1911. However, many photos of all repairs are available at NMPC offices.

2.3 Operation

The lake level is monitored and recorded daily throughout the year. We were informed by NMPC personnel that the deed restrictions require the lake level to be maintained within three feet of the spillway crest between Memorial Day and Labor Day. During winter, a continuous

flow is maintained from the lake to avoid the freezing of the downstream channel, by keeping the water running at all times. By spring, the lake level is intentionally drawn down 10 to 14 feet below spillway crest to accommodate the anticipated runoff, estimated from the snow cover.

The high water mark is 6 inches above spillway crest, whereas we were informed that in the past 14 years, the spillway crest has been topped by a maximum of 4 inches of water. An inspection report (Appendix E) dated September 7, 1913, by Mr. A. R. McKim, records "water 5 ft. below crest", but at the same time it also records "Highest water over spill 16", both gates open". The latter statement may be referring either to the design water level or to a previously observed maximum water level, but at this time it is not possible to establish its meaning. The maximum past flood may, therefore, be assumed to correspond to the high water mark of 6 inches above spillway crest, resulting in a discharge of 280 cfs if both gates were closed, or 970 cfs if both gates were fully opened (Refer to pages 2 and 6 of hydraulic computations in Appendix C).

2.4 Evaluation

a. Availability

Engineering data were provided by the New York State Department of Environmental Conservation (NYSDEC). Mr. Robert Levett, Associate Senior Engineer, along with three other personnel from NMPC, were available at the site to answer any technical questions. Mr. Levett's cooperation facilitated the satisfactory and timely completion of the inspection.

b. Adequacy

The nature and amount of available engineering data are adequate to make a preliminary assessment of the structural stability of the subject dam.

The available hydraulic/hydrologic data are not adequate to perform a detailed analysis of the dam's ability to pass the recommended Spillway Design Flood (SDF) as contained in Recommended Guidelines for Safety Inspection of Dams, Department of the Army, Office of the Chief of Engineers. Consequently, the assessment presented in this report is founded on approximate solutions based on data contained in Upper Hudson and Mohawk River Basins Hydrologic Flood Routing Models (October 1976), a report prepared for the Department of the Army, New York District, Corps of Engineers, by Resource Analysis, Inc.

c. Validity

In general, there is no reason to question the validity of the data obtained from the sources listed in Section 2.1. There is an apparent error in the November 1910 drawing (Plate II) which shows the length of gravity wall as 154 feet instead of 120 feet, as indicated on later inspection drawings (Appendix E). The 120-foot length is also confirmed by stopping the gravity wall crest at 1383 feet contour line on the November 1910 drawing and scaling off the length of the gravity wall. The inspection drawings also show a different kind (concrete and earthen) and length (312' + 350') of dike than shown on the November 1910 drawing (Plate II), but this is understandable because of the note on the original drawing stating "Design of dike subject to modifications in the field".

2.5 Geology

a. General Geology

The damsite and reservoir lie in central Fulton County. The bedrock is interlayered granitic, charnockitic or syenite gneiss and metasediments.

There are three northeast-southwest trending linements within 2 miles of the damsite. There is a normal fault about 3 miles east of the dam, with the dam being on the upthrown side.

The region had been subjected to glaciation during the Wisconsin stage and a thin veneer of glacial deposits mantles the bedrock. The site is part of the glaciated Adirondacks.

b. Site Geology (interpeted from stereo-pair air photos)

Rock appears to be shallow. The rock type is metasediments. Lake slopes are moderately steep on all sides, with the notable exception of the southeast corner (right of the dam).

The downstream channel is fairly straight and open. Two highway bridges cross the downstream channel within 1,200 feet of the dam. At the time of the photos, water was flowing over the spillway.

At the time of the photos, ice covered the lake; therefore, siltation, if present, is not visible. There is no downstream habitation within 3,000 feet of the dam apparent.

Many streams serve as lake inlets. At the north end of the lake, there is an earthen structure (dike) with a stream channel (normal to the dike) beyond. No outlet works were visible.

There were no geologic features detected or suspected (stratification, faults, cavities, etc.) that could be expected to adversely affect the dam or its appurtenant structures.

SECTION 3

VISUAL OBSERVATIONS

3.1 Findings

a. General

The Peck Lake Dam is a concrete buttressed arch dam flanked by a gravity spillway on the right (beyond which are concrete and earth dikes) and a gravity wall on the left. Its primary objective is to store water for the generation of electricity farther downstream at Ephratah power house. The discharge from Peck Lake is controlled, and water is released through the twin 36-inch diameter outlet pipes according to the general electricity generation demands on the system of reservoirs under the Ephratah Development. Peck Lake is fed by its own watershed composed of many small streams.

This dam has undergone extensive repairs in 1970, 1976 and 1977, and the concrete is still badly deteriorated in many places. Seepage was observed in many places. Otherwise, the dam appeared to be functioning satisfactorily on the day of the inspection.

The USGS quadrant maps show a dam on the northern side of Peck Lake. This inspection did not include a visit to that dam. We are, however, informed by Mr. Levett of NMPC that it is an earthen dam with no overflow section. A study of the air photos confirms this information.

b. Dam

The access to the dam is through Peck Lake Road, which takes off from Route 29A, passes along the downstream side of the dam, forms a half loop, and joins Route 29A again about 1¼ miles from the point of entry. This is a paved road and appears to be well maintained. It was found to be in very good condition on the day of the inspection.

The left gravity wall contains a boat dock (Fig. 1, Appendix D). The soil in the barn just downstream of the gravity wall was wet, but there were no signs of seepage. The downstream slope of the gravity wall is slightly scaled to depth [illegible] to 2 inches (Fig. 2, Appendix D). Some prior guniting was observed on the wall.

Minor seepage was observed at the junction of the gravity wall with the tenth arch, slight seepage from below the buttress to the left of Arch 10, and slight base seepage under Arch 10. Soil off the roadway was wet, and there was ponded water in a trench along the roadway. A moderate amount of seepage was occurring from the buttress between Arches 10 and 9, and extending to the next buttress. Slight seepage from Arch 9 is causing wet subsoils at the base of the dam. Arch 8 is badly spalled with very minor seepage (Fig. 3, Appendix D). A small stream carrying seepage water runs along the entire length of buttressed dam adjacent to the roadway (Fig. 6, Appendix D). The joint between Arches 7 and 8 was repaired in 1976 and is now in good condition. The downstream half of Arch 7 was completely rebuilt in 1976, but is leaking at present.

The buttress between Arches 7 and 6 shows the worst deterioration, illustrated by severe cracking and massive spalling (Fig. 5, Appendix D) of the cold joint and a big hole at the bottom, which was wet. Arch 6 has major spalling with one gouge type spall. There was slight seepage high on the wall. The buttress between Arches 6 and 5 is badly scaled. On the right side of the buttress, at the arch, there was a hole in the ground covered with stones. We could not determine if it was an abandoned animal burrow, or the beginning of piping, or something else. Major scaling and spalling was noticed in Arch 5. Some seepage was taking place about halfway up the wall and along the base for about half the arch length. Minor leakage was also observed in areas that had been previously injection-grouted.

The buttress wall between Arches 4 and 3 is moderately scaled and has a large spall about 3/4 of the way up the wall near its junction with Arch 4 (Fig. 6, Appendix D). Another large spall was also noticed at the base of this buttress wall along a construction joint crack. Near the top, Arch 3 is spalled over its entire length (Fig. 7, Appendix D). The buttress between Arch 1 and Arch 2 is severely spalled and scaled. Some seepage was visible at the joint between the buttress and Arch 2.

Arch 1 is badly spalled and scaled. The left half of the arch is seeping moderately and the wall is wet halfway around. Arch 1 is slightly bulging inward at about the lower third point, but this visual effect may be caused by the gunite.

Generally, the entire dam is so badly spalled and scaled that it is not possible to list all areas of deterioration.

There is a swamp area at the base of Arches 3 and 2 with some woody growth and cattails. To keep feet dry, a raised wooden boardwalk leads from Arch 3 to Arch 1, where the gate house is located. All accumulated seepage water passes under the boardwalk and flows into the gate discharge channel, then under the roadway bridge.

The buttress between Arch 1 and the gravity spillway has major spalls and has undergone toe erosion. The junction of this buttress with the spillway is seeping.

The gravity spillway is founded on rock which is exposed at the surface, and is sloping down from right to left (Fig. 8, Appendix D). The discharging water (from over the spillway) would flow down to the left into the discharge channel, and then under the roadway bridge (Fig. 9, Appendix D). The downstream face of the spillway is severely spalled, and vegetation is growing out of spalls (Fig. 10, Appendix D). One of the spillway spalls is eroded about 2 feet deep, exposing cyclopian concrete and a metal pipe (Fig. 11, Appendix D). Some epoxy-grouted areas were noticed in the spillway, but seepage was still evident through and beneath the spillway. There is substantial vegetation just beyond the right hand portion of the spillway toe, that would impede flow.

c. Appurtenant Structures

1) Gate House

The gate house is located in Arch 1 (Fig. 12, Appendix D). The gate house is a wood frame structure which appears to be founded on rock, but this could not be confirmed. Access to the gate house is through a boardwalk leading from the roadway. In the gate house, there are two manually-operated gate valves, one over each of the two 36-inch diameter outlet pipes. At the time of the inspection, the left gate was open about 10 inches and the right gate completely closed (with water trickling from it). For the sake of inspection, the left gate was opened and the right kept closed. Then, the left gate was shut and the right opened. Both of the gates functioned smoothly with great ease. The tailwater was initially about 2 inches below the pipe invert, but it fluctuated when the gates were opened, and the water level rose to about 2 inches above the pipe invert.

2) Intake Structure

The access to the intake structure is from the boardwalk via a steel stairway along the downstream sloping surface of the buttress between Arches 1 and 2

(Figs. 12 and 13, Appendix D). The pipe railing, the steel frame, and the intake structure in general (Fig. 14, Appendix D) appeared to be in good condition. Chains for emergency closure flap valves appeared to be well maintained, but the system was not actuated during the inspection.

3) Concrete Dike

The concrete dike, starting to the right of the spillway, is badly spalled on both upstream and downstream faces. The top of the dike is 3 feet above the spillway crest. The dike is overgrown with moss, and walking on top of the concrete is difficult due to overhanging trees and woody growth on both sides (Fig. 15, Appendix D). The upstream side at the junction between the dike and the spillway is dry, but a small swampy area starts about 40 feet to the right of this junction. Stagnant water and swamp was also noticed on the downstream side of the dike.

d. Foundation

The foundation of the major portion of this dam is not visible, except for the gravity spillway section which is founded on rock. Design drawings show the buttressed arch dam and the gravity wall embedded in glacial till to various depths (Plate II). The buttress between Arches 1 and 2 is shown to be embedded 7 feet in till and 3 feet in rock.

e. Reservoir Area

The side slopes of the lake are variable, at least within a half mile on both shores of the dam. The general range is from 2 horizontal to 1 vertical, to 4 horizontal to 1 vertical (Fig. 16, Appendix D).

The side slope is flatter along the bay that extends to the right of the dam. The roadway and grade surrounding the bay were checked (Fig. 17, Appendix D) and found to be at least 5 feet above the lake water level, which was 4'2" below the top of the dam on that day. Therefore, the roadway and the surrounding grade are higher than the top of the dam.

There is a boat dock along the left gravity wall.

f. Downstream Channel

There is a roadway bridge (Fig. 9, Appendix D) about 100 feet downstream of the discharge pipes, but it is not expected to be an obstruction. The side slopes are heavily wooded and difficult to access, but appear to be stable. The downstream channel seems to be clear with no apparent obstruction to flow.

There are two homes immediately below the gravity wall and left buttressed section. These homes will be affected in the eventuality of overtopping or failure of the dam. No further check on the downstream population was made.

3.2 Evaluation

In spite of the fact that this dam has received major repairs in 1970, 1976 and 1977, the structural concrete was found to be badly deteriorated at the time of inspection. We were informed that there is a 5-year warranty on Arches 5 through 10, so some repairs are scheduled for this year.

Although repairs are needed throughout the dam, the worst areas of deterioration are: Arch 8, buttress between Arches 7 and 6; Arch 6, buttress between Arches 6 and 5; Arch 5, buttress between Arches 4 and 3; top portion of Arch 3; leakage in Arch 1, and the spalls in the downstream face of the gravity spillway.

Seepage is taking place through all ten arch sections to varying degrees from minor to moderate. The 7th arch, whose downstream half was recently (1976) rebuilt, is also leaking. This seepage, if allowed to persist, will continue to deteriorate the concrete, and any effort to provide only cosmetic repairs will be futile. We were told that NMPC did not like guniting because it hides any apparent defects.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

There are no formal procedures for operations at Peck Lake that we are aware of, except that the deed restriction requires the water level in the lake to be within 2 feet or 3 feet of the spillway crest between Memorial Day and Labor Day. However, this restriction is waived in case of emergencies or for the sake of repairs. The precedents are 1970 and 1976 repairs, when the water was drawn down about 20 feet.

Water is drawn from the lake at a rate depending on the downstream requirements for electric generation at Ephratah power house. Also, during winter, a continuous flow is maintained from the lake to prevent the freezing of the downstream channel, by keeping the water running at all times. By spring, the lake level is purposely drawn down 10 to 14 feet to accommodate the anticipated runoff, estimated from the snow cover.

4.2 Maintenance of Dam

Although there was no formal maintenance procedure disclosed, efforts are being made to keep the dam and its appurtenant structures in satisfactory condition. Some major repairs have been done in the recent past (1970, 1976, 1977) and others are scheduled for this year. We were informed by the NMPC personnel that although the dam does not appear to be in good condition at this time, it is 100% better than it was 2 years ago.

4.3 Maintenance of Operating Facilities

In general, the operating facilities appear to be maintained satisfactorily, although the emergency chain and flap gate closure arrangement was not actually tested.

4.4 Warning Systems in Effect

The local police and fire department have the emergency telephone numbers for NMPC. These phones are manned 24 hours per day, and once these numbers are called, NMPC reaches the appropriate individuals for necessary action. We were informed that an emergency procedure manual is under preparation, but is not ready yet.

4.5 Evaluation

Currently, there is no formal program that we are aware of for regularly scheduled maintenance to the dam. However, the dam has had major repairs in the past (1970, 1976 and 1977), and in accordance with a 5-year warranty on Arches 5 through 10, some repairs are scheduled for this year.

Seepage to some degree is taking place throughout the buttressed and spillway sections. The concrete could deteriorate further if this seepage continues unchecked.

In general, the operating facilities (gate facilities) appear to be maintained satisfactorily.

There is an emergency procedure in use at the present time, but it is not formally written down. We are informed that an emergency procedure manual is under preparation.

SECTION 5

HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Hydraulic Features

a. Design Data

There are no design data available, either for the discharge over the spillway or for the flow through the twin 36-inch outlet pipes.

Computations performed as part of this study indicate the following flows for the conditions noted (Refer to Appendix C):

1) 4800 cfs (Sheet 6 of hydraulic computations in Appendix C). Twin 36-inch diameter pipes fully open with 3 feet of water over spillway (maximum pool elevation).

2) 4100 cfs (Sheet 2 of hydraulic computations in Appendix C). Twin 36-inch diameter pipes closed with 3 feet of water over spillway (maximum pool elevation).

b. Experience Data

Although the water level at the lake is recorded daily, no formal record of flow measurement over the spillway or through the outlet pipes is available.

c. Visual Observations

The high water mark on the spillway abutments is 6 inches above spillway crest, whereas we were informed that in the past 14 years, the spillway crest has been topped by a maximum of 4 inches of water. An inspection report (Appendix E) dated September 7, 1913, by Mr. A. R. McKim, records "Water 5 feet below crest", but at the same time it also records "Highest water over spill 16", both gates open". The latter statement may be referring either to the design water level or to a previously observed maximum water level. At this time, it is not possible to verify it one way or the other. The maximum past flood may, therefore, be assumed to correspond to the high water mark of 6 inches above spillway crest, resulting in a discharge of 280 cfs if both pipes were shut off, or 970 cfs if both pipes were fully opened (Refer to Sheets 2 and 6 of hydraulic computations in Appendix C).

5.2 Evaluation of Hydrologic Features

a. Design Data

The only hydrological datum available is the storage capacity of Peck Lake versus elevation (Appendix E). According to the Recommended Guidelines for Safety Inspection of Dams, Department of the Army, OCE, the recommended Spillway Design Flood (SDF) for the subject dam is the Probable Maximum Flood (PMF), since the dam is of intermediate size and poses a high hazard.

b. Experience Data

Information on the PMF for Peck Lake and its watershed was obtained from the Upper Hudson and Mohawk River Basins Hydrologic Flood Routing Models prepared in 1976 for the New York District of the U.S. Army Corps of Engineers (USACE) by Resource Analysis, Inc. In this study, the rainfall-runoff mathematical model HEC-1 was used to reconstitute the major historical floods and to simulate the Standard Project Flood (SPF). In a telephone conversation with Mr. Thomas Smyth, USACE New York District, we were informed that for Phase I hydrologic analyses, the Probable Maximum Flood (PMF) could be considered as twice the SPF.

Peck Lake and its drainage basin are located within Subarea 22 of the Mohawk Basin, Little Falls, N.Y. to Mouth. Computations for routing the PMF through Peck Lake are found in Appendix C of this report.

c. Visual Observations

Interviews with personnel of NMPC revealed that the maximum observed flood in their recollection over the past 14 years occurred when water rose only about 4 inches above the spillway. This appears to be verified by the high water mark, which is about 6 inches above the spillway crest. It was also revealed that the pool of Peck Lake is purposely lowered 10 to 14 feet during the winter to accommodate the runoff from the snow cover. This may explain why little overflow was noted, even in years of heavy precipitation.

d. Overtopping Potential

The computations in Appendix C indicate that the subject dam will be overtopped by the PMF. The maximum height of water that can flow over the spillway section, without overtopping the dam, is 3 feet. At that height,

the spillway passes 4100 cfs and the pipe outlets 690 cfs for a total of about 4800 cfs. The computed PMF is 10,200 cfs. Therefore, the spillway alone can pass only about 40 percent of the PMF, and the spillway coupled with the outlet pipes can pass 47% of the SDF. In the eventuality of overtopping of the dam, erosion of soil on the downstream side of the dam will occur, resulting in reduced passive resistance of the concrete structure, which will reduce the stability of the dam, and failure of the dam could result.

e. Spillway Adequacy

The results of the hydrological analysis indicate that the spillway capacity is inadequate with respect to passing the PMF. In addition, the spillway is considered seriously inadequate because it satisfies all of the following conditions set forth in DAEN-CWE-HY Engineer Technical Letter No. 1110-2-234 dated 10 May 1978:

1. There is high hazard to loss of life from large flows downstream of the dam.

2. Dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

3. The spillway is not capable of passing one-half of the Probable Maximum Flood without overtopping the dam and potentially causing failure.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

Visual observations of the buttressed arch dam, the gravity wall and the gravity spillway did not reveal any signs of immediately impending structural instability, although extensive spalling, scaling and a minor to moderate amount of seepage was noticed throughout the dam. Arch 1 was noticed to have bulged inwards starting at about 2/3 of the way down from the top of the wall, but this visual effect may have been produced by guniting.

b. Design and Construction Data

No stability computations were available for review. Also, there are no formal records of construction available. The only design data available are the five drawings prepared in 1910 by Wm. Barclay Parsons, Consulting Engineers, 60 Wall Street, New York. These drawings are presented in this report as Plates II through VI.

For the present study, the stability of the buttressed arch section was evaluated at two locations by Lev Zetlin Associates, Inc., Engineers and Designers, 95 Madison Avenue, New York, New York. One of the sections considered was Arch 2 in conjunction with the buttress between Arches 1 and 2. The second section studied was Arch 5 along with the buttress between Arches 4 and 5. In the analyses, hydrostatic uplift forces were ignored because they would be negligible in view of the small base area of the arch and buttress. The water level in the lake was assumed at elevation 1380, and an ice thrust of 7.5 kips per linear foot of the dam was taken to act at spillway crest level. Lev Zetlin Associates, Inc. concluded that since the entire base of both the sections considered is in compression, both sections are safe against overturning. They also concluded that both sections were marginally safe against sliding (Refer to computations in Appendix C).

The stability of the gravity spillway was analyzed by Converse Ward Davis Dixon for two sections; the first section was the deepest section (base at elevation 350) at the left abutment, and the second section

considered was one with average depth (base elevation 265). These two sections were studied for two cases of water and ice thrust. Case 1 assumes the water level at the spillway crest (elevation 380) and an ice thrust of 7.5 kips/foot at elevation 379. Case 2 assumes the water level at the maximum pool (elevation 383). Since the spillway is founded on rock, the uplift for both cases was assumed to be 33% of the hydrostatic pressure at the upstream end of the base (heel), decreasing linearly to zero at the downstream end of the base (toe). Under Case 1 loading, both sections were found unsafe against sliding and overturning. Under Case 2 loading, both sections were found safe against overturning and the factor of safety against sliding was close to 1.

A section of the gravity wall was analyzed for the Case 1 and 2 loading. The hydrostatic pressure was assumed to dissipate linearly along the embedded portion of the wall with an 8 and 11 foot head of water, respectively, for Case 1 and Case 2 loading, at the junction of the upstream face and lake bottom, and zero head at the junction of the downstream slope and ground surface. The stability computations for Case 1 revealed that the resultant of forces falls outside the base of the dam. The factor of safety against sliding was also found to be slightly less than 1. For Case 2 loading, the resultant fell outside the middle third of the base, although the section was found to be safe against sliding. All computations can be found in Appendix C.

c. Operating Records

There are no formal operating records from which to evaluate the stability of the subject structure.

Based on the analysis done for this study, the arch section is safe against overturning and marginally safe against sliding for Case 1 loading. The rest of the dam is unsafe against overturning and sliding for Case 1 conditions. Only spillway and gravity sections were analyzed for Case 2, and were found marginally safe.

Factors of safety for Case 2 would be larger for the maximum observed flood, which reportedly occurred at a spillway overflow of 4 inches as indicated previously. Similarly, Case 1 loadings are also much smaller in reality, because the lake water level is kept 10 to 14 feet below the spillway crest in the winter.

d. Post Construction Changes

Major repairs, including guniting and epoxy injections, were done to the dam in 1970, 1976 and 1977, but there are no reported post construction changes that would affect the stability of the subject dam.

e. Seismic Stability

The Peck Lake Dam is nominally located on the border between Seismic Zone 1 and Seismic Zone 2 according to the Algermissen Seismic Risk Map. The USACE guidelines suggest that in the event of doubt about the proper zone, the higher zone should be used. Although earthquakes that cause moderate damage can be expected to occur in Zone 2, the design and construction practices conventionally used for small concrete gravity dams are considered to be adequate in areas of low seismicity, and the safety factors used for static conditions should preclude major damage for all but the most catastrophic earthquakes. In the case of this particular dam, the safety factors are marginal and any seismic effect will make conditions worse. However, no computations were performed to evaluate the effect of earthquakes on the subject dam.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

Visual inspection of the dam revealed extensive deterioration of the concrete and the occurrence of minor to moderate amounts of seepage through and under the dam. Continued seepage could lead to serious deterioration of the concrete, may cause pipes in soil, and could eventually lead to failure. There is no evidence to indicate the existence of presently unsafe conditions, although for Case 1 loading (ice thrust at spillway crest - refer to Section 6) the gravity spillway and gravity wall were both found to be unsafe against overturning and sliding, and the buttressed arch section marginally safe against sliding. For Case 2 loading (water level at crest of dam - refer to Section 6) the gravity spillway and the gravity wall are marginally safe.

Our approximate hydrologic/hydraulic calculations indicate that the discharge capacity of the spillway and the outlet pipes is seriously inadequate according to the OCE screening criteria.

b. Adequacy of Information

The information available to us was adequate to perform fairly detailed analyses of the structural stability of the dam under assumed conditions of water overflow and uplift pressure. These data are sufficient, in conjunction with the results of the visual inspection, to make a reasonable assessment of the system's present condition. However, since the safety of the dam is only marginal for the evaluated conditions, a subsequent, more detailed investigation is considered necessary, and the stability of the dam should be re-evaluated in light of the new findings.

Since there were no direct hydrological data available, our assessment of the overtopping potential is based solely on interpolation of modelling results for a drainage basin that includes the subject watershed.

c. Urgency

Inasmuch as the discharge capacity appears to be very seriously inadequate according to the OCE screening criteria, since the downstream area contains homes, and since the safety of the dam is only marginal for the evaluated conditions, there is some urgency in performing the additional study recommended below.

Likewise, since deterioration of the concrete could lead to serious structural damage, and since this deterioration will continue as long as the seepage problem is not corrected, there is some urgency in performing the repairs recommended below.

d. Necessity for Further Investigations

There are four areas that require further investigation:

1) In view of the very serious inadequacy of the dam to pass even one half of the PMF without the occurrence of overtopping, a detailed hydrologic and hydraulic evaluation of the watershed and the spillway and outlet pipes should be performed using more precise and sophisticated hydrological/hydraulic methods and procedures. This further investigation should be performed as soon as possible. Following this study, the need for and type of mitigating measures should be determined. Until such a study is completed, around-the-clock surveillance of the structure should be provided during periods of unusually heavy precipitation.

2) Since stability computations are very sensitive to values of uplift pressure in the case of concrete gravity dams, and since certain assumptions regarding that pressure were made in the computations for this study, a field study should be performed to measure actual uplift pressures at the base of the dam. This study should be performed as soon as practicable, preferably within one year's time.

3) The design drawings do not show the gravity spillway to be either embedded in the rock or keyed to it by some other means. Since the stability analysis is very sensitive to the keying of the dam to its foundation, an investigation should be made to verify the actual, as built, conditions. This investigation and revised analysis should also be performed as soon as possible, preferably within the next year.

4) With seepage emerging beyond the toe of the dam, a seepage evaluation (using piezometers) should be performed and mitigating measures (e.g. grouting and/or subdrainage pipes) established, preferably within the next year.

7.2 Recommendations and Remedial Measures

a. Alterations/Repairs

1) The seepage coming through the buttressed section and the gravity spillway should be stopped by effective repair techniques such as injection grouting.

2) All cracked, spalled and deteriorated concrete throughout the dam (refer for specific areas to Section 3) should be repaired.

3) Since the safety of the dam has been computed to be marginal, a more detailed investigation is recommended, and the stability of the dam should be re-evaluated. If the dam were still found to be only marginally safe, remedial measures may be required, such as dowelling the concrete gravity spillway to the rock foundation, increasing the mass of the walls, etc.

4) A major reconstruction of the dam should be planned within the next few years.

5) The overhanging trees and woody growth on both sides of the concrete dike should be cleared.

6) Stagnant water and swamp on the downstream side of the dike should be drained off by clearing the heavily overgrown vegetation.

7) Vegetation should be cleared from the spillway discharge area.

Items 1, 2 and 7 should be carried out within a year. Investigation and re-evaluation of the dam stability, referred to in Item 3, should also be completed within the year. Items 5 and 6 should be taken care of as soon as practicable, but certainly within the next three years.

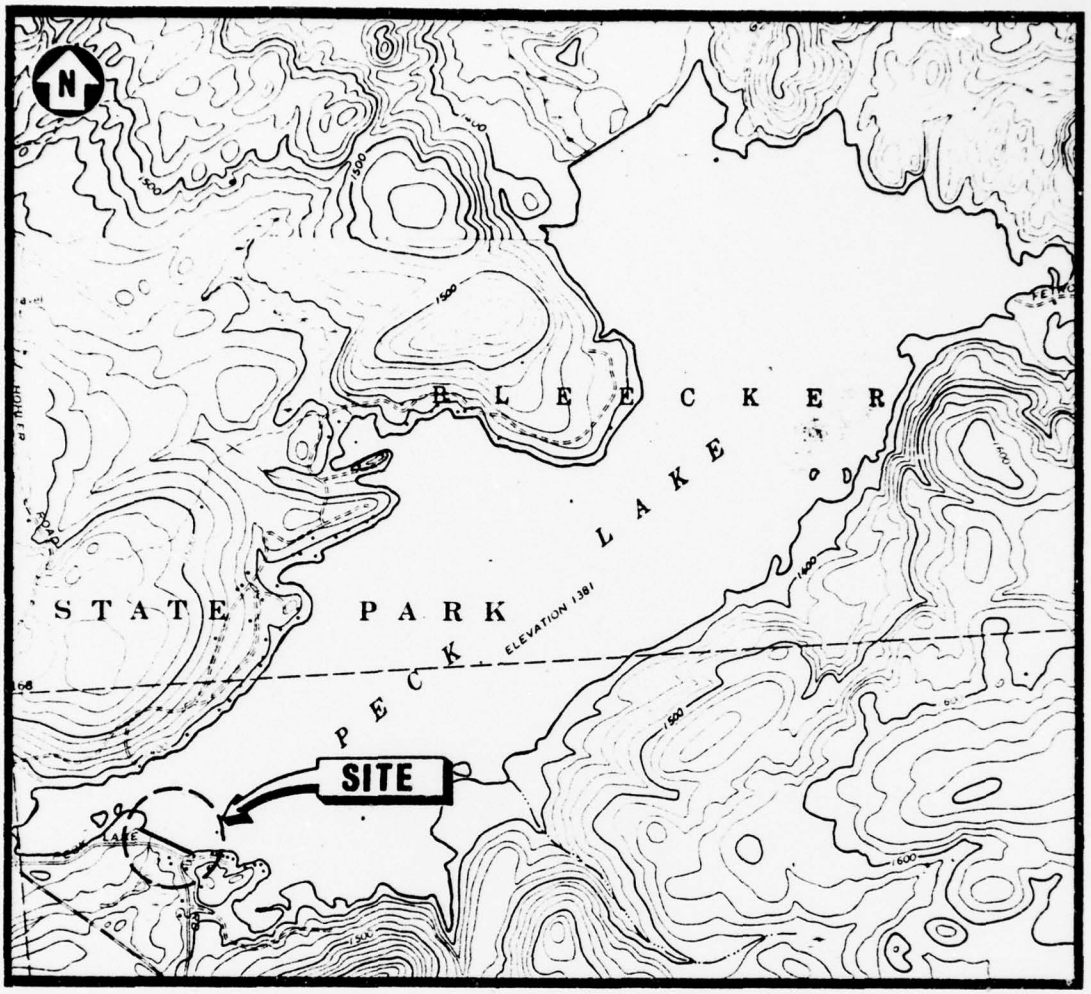
b. Operations and Maintenance Programs

1) The emergency warning procedure manual which is under preparation should be formulated in coordination with local law enforcement and emergency rescue authorities. This document should contain chain-of-command names and

telephone numbers in the case of an emergency. Consideration should be given to methods of implementation, in the event that telephone lines are down, roads closed, etc. The emergency warning procedure should be developed and officially presented to the authorities as soon as possible.

2) A specific program for the normal operation of the dam should be developed and implemented. In this program, the duties of responsible parties should be clearly defined. Specific operational procedures should be developed for various seasonal conditions. For example, the safety of the dam requires that the present practice of lowering the pool level in winter should be strictly continued (unless a subsequent study indicates that it is not needed). Similarly, for the safety of the dam, during periods of heavy precipitation, the pool level should be constantly monitored to avoid overtopping of the spillway by more than a few inches. The overtopping of the spillway could also be minimized by keeping the level at the minimum permissible elevation (deed restriction) and at the same time be capable of meeting the demands of the downstream Ephratah power house.

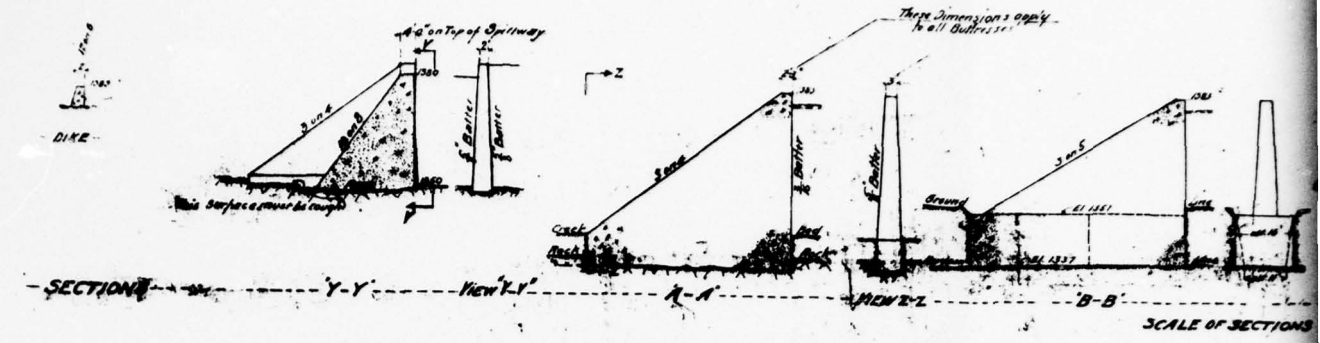
3) A specific program for the periodic maintenance of the dam and its operating equipment should be established and followed.

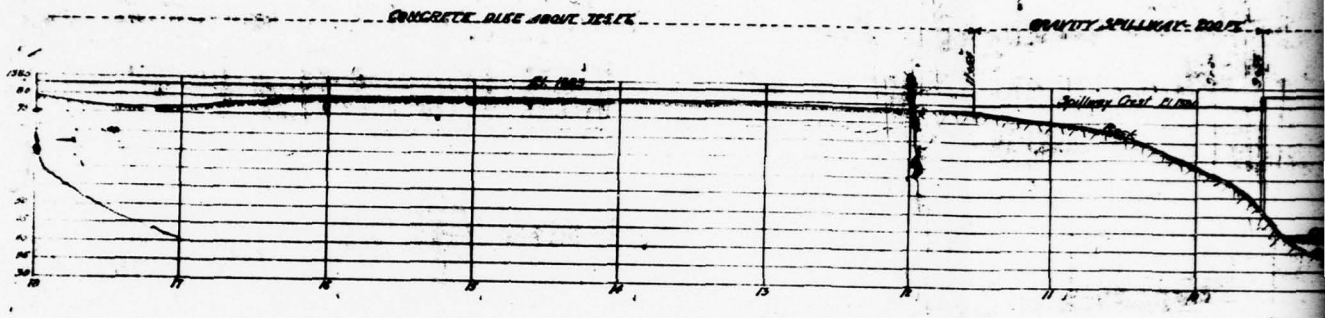


SCALE 1" = 2500'

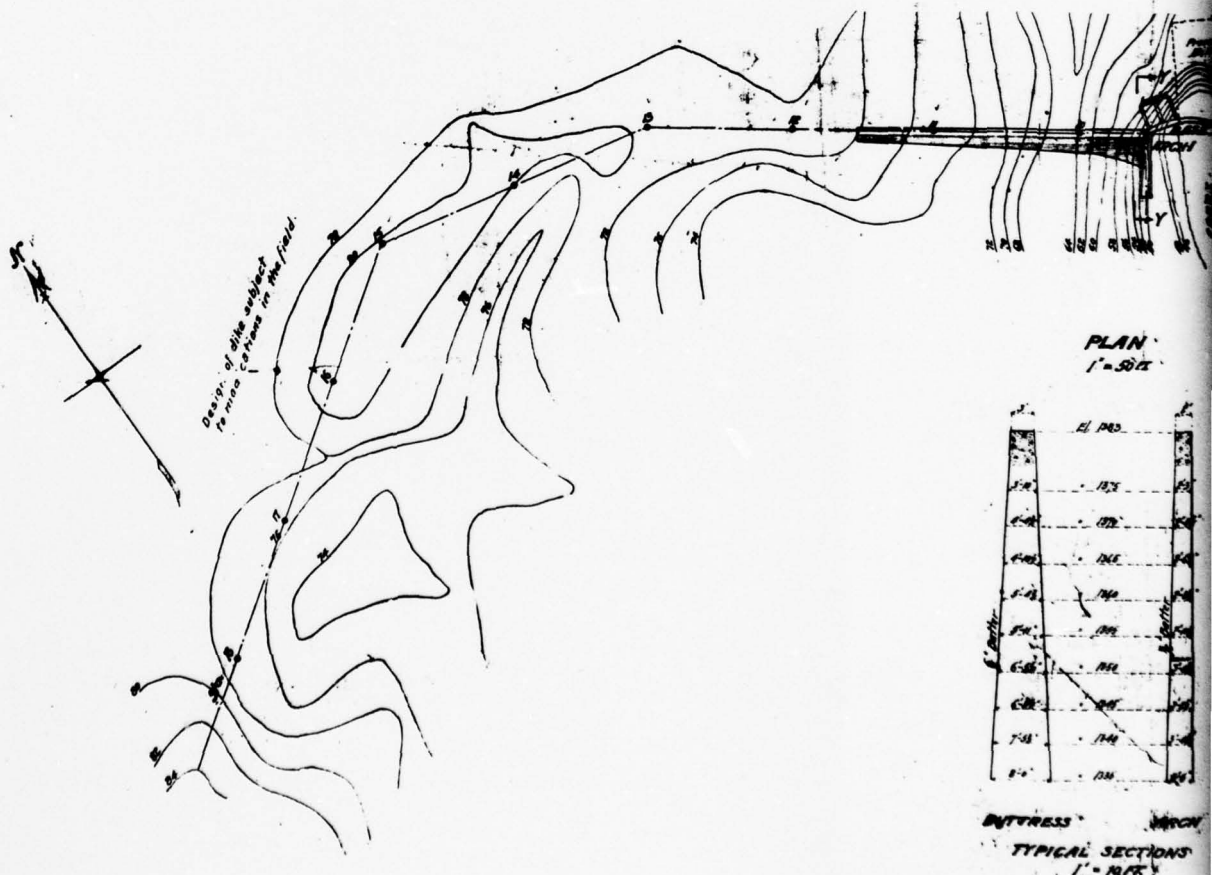
MAP SOURCE: BASE MAP WAS ADAPTED FROM U.S.GEOLOGICAL SURVEY MAP, PECK LAKE, N.Y. QUADRANGLE, AND CAROGA LAKE, N.Y. QUADRANGLE, BOTH 7.5 MINUTE SERIES AND BOTH 1970.(BASE MAP MAY NOT REFLECT RECENT CARTOGRAPHIC CHANGES).

PLATE I SITE LOCATION MAP



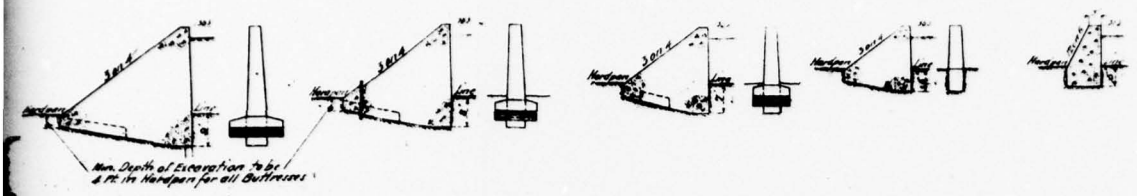


PROFILE
Hor. Scale 1"-50'
Vert. " 1"-20'



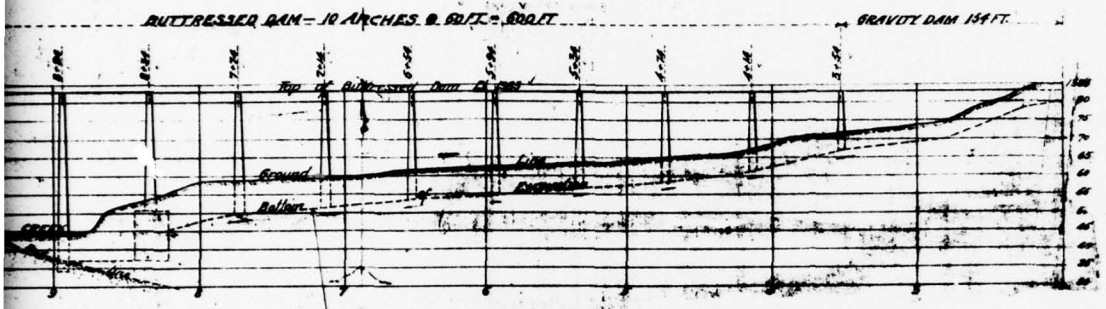
PLAN
1"=50'

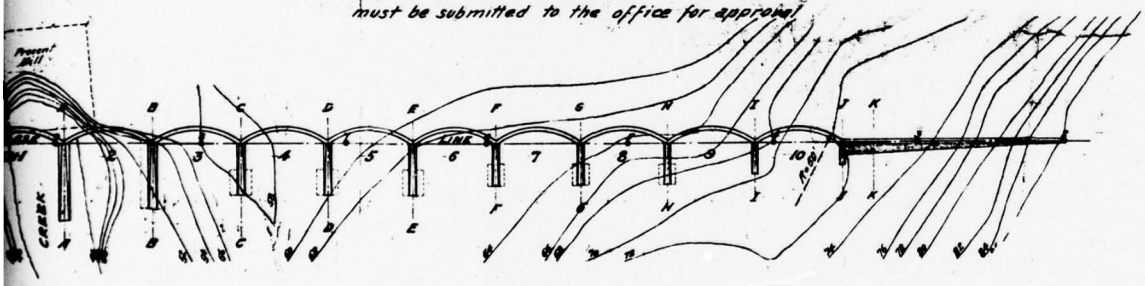
TYPICAL SECTIONS
1"=10'-0"



C-C; D-D; E-E — A-F; G-G; H-H — I-I — J-J — K-K

1"=20 FT.





For Details of Intake see Sheets 1288 & 1295
" " " Buttresses - Sheet 1303 & 1288

Spillway revised 9/18-1911

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE II SEPTEMBER 1978

MOHAWK HYDRO-ELECTRIC CO.

PECK'S LAKE DAM

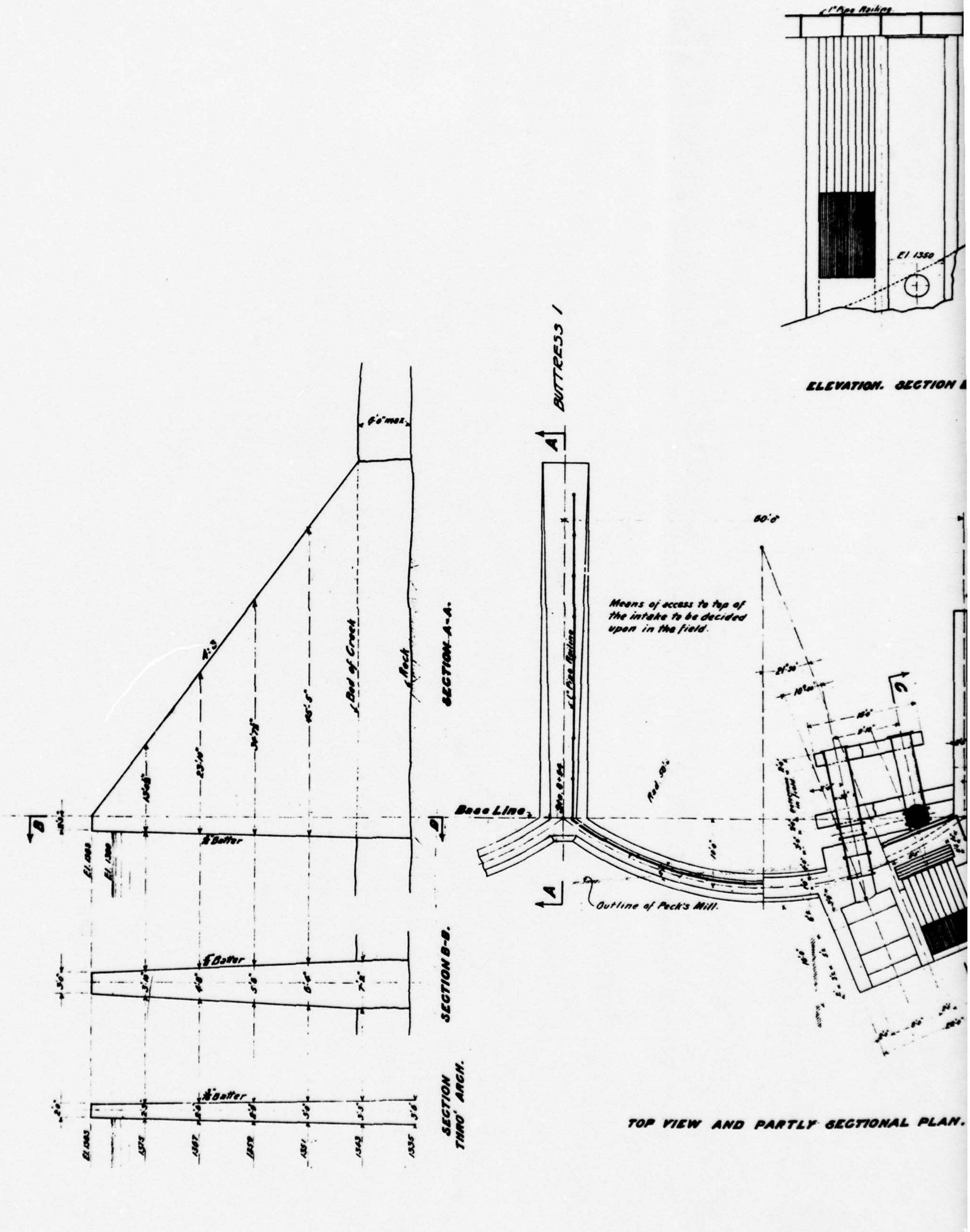
Nov 1910

Scales as noted

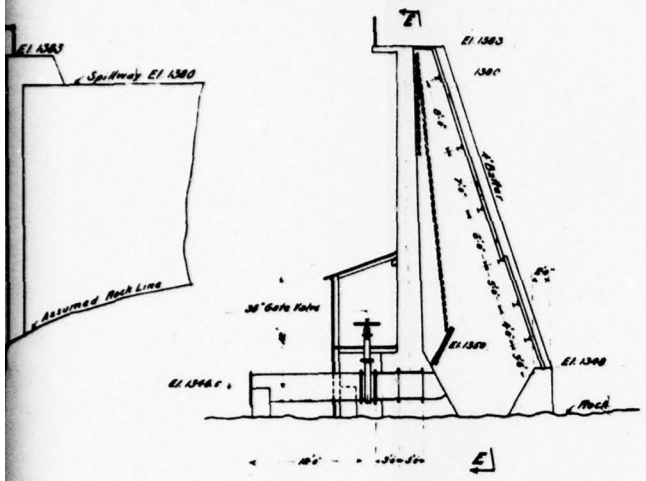
Wm Barclay Parsons
Consulting Engineers
60 Wall St. New York.

Drawn by
Checked
Approved

2



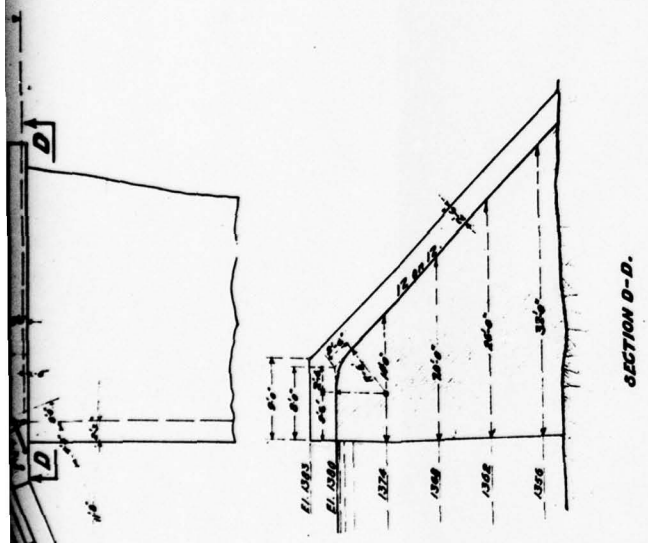
1" Pipe Railing
El 1350
ELEVATION. SECTION
BUTTRESS 1
Means of access to top of the intake to be decided upon in the field.
60'-0"
Base Line
Outline of Peck's Mill.
Bed of Creek
Rock
SECTION A-A.
SECTION B-B.
SECTION THRO' ARCH.
Batter
6'-0" max.
TOP VIEW AND PARTLY SECTIONAL PLAN.



E-E.

SECTION C-C.

Elevation of pipes, given here as 1346.5, to be verified in the field.



SECTION D-D.

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE III SEPTEMBER 1978

MOHAWK HYDRO-ELECTRIC CO.

PECK'S LAKE DAM.

DETAILS.

Oct. 1910.

Scale 8" = 1'-0"

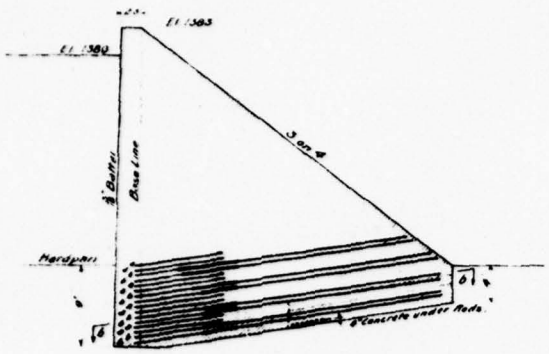
Wm Barclay Parsons,
Consulting Engineers,
60, Wall St., New York.

Revised 10/15-1910

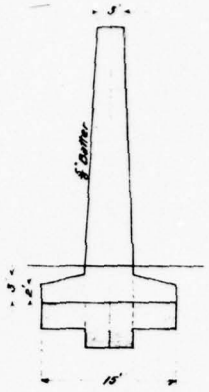
L 35 Mohawk

1

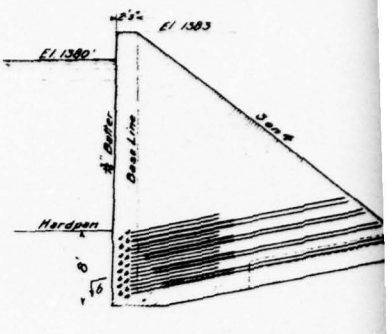
2



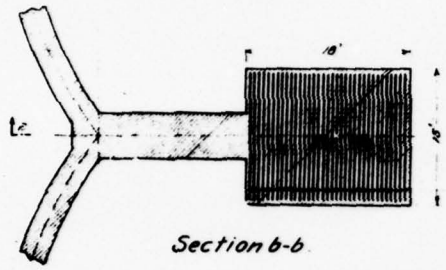
Section a-a.



End View

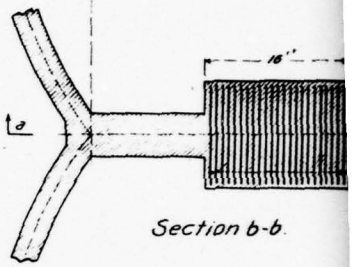


Section a-a



Section b-b

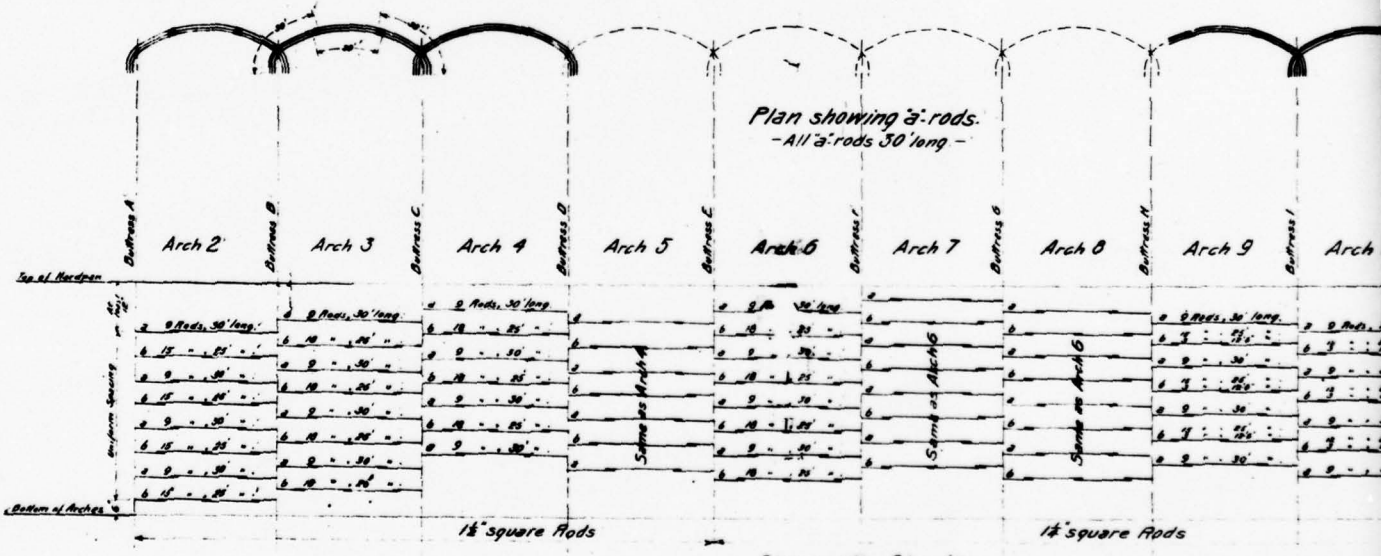
— BUTTRESSES C, D & E —



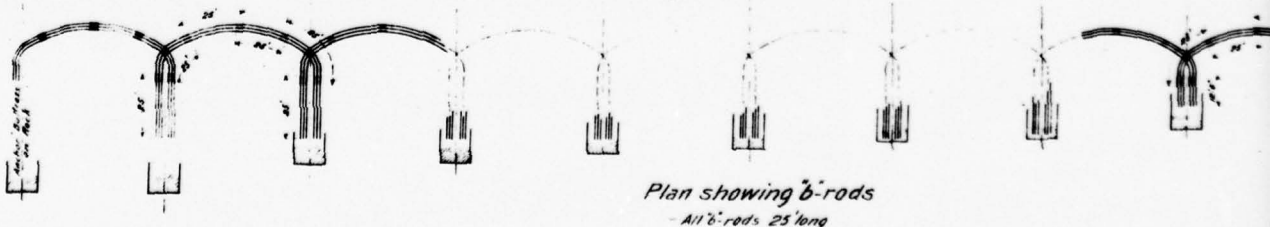
Section b-b

Scale 1/8"-1'-0"

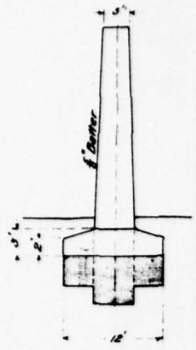
→ Buttresses A & B shown on General Plan, Sheet 1307 —

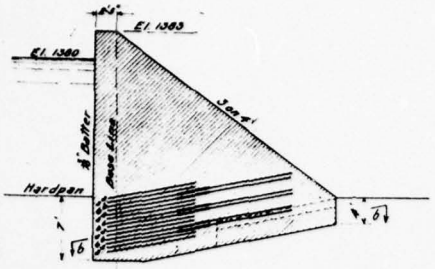


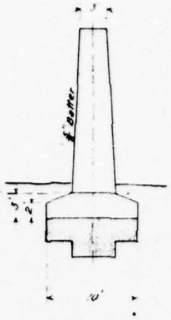
Diagrammatic Elevation

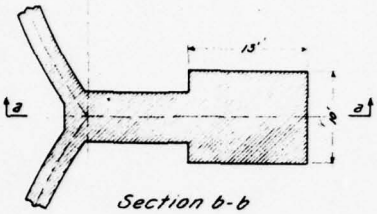


Plan showing 'b' rods
- All 'b' rods 25' long
except in Buttress F -





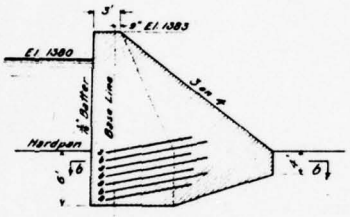


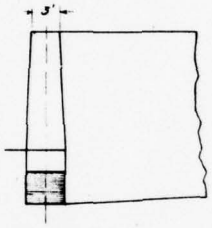


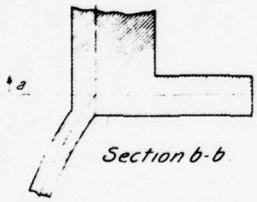
— BUTTRESS I —

— BUTTRESSES F, G & H —

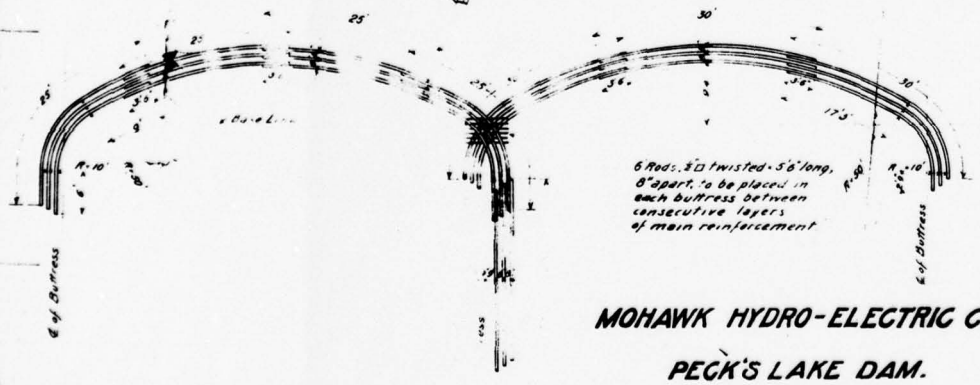
ched cut-off wall to be carried down from 6 to 9
t below top of hardpan or equally good material,
as shown on sections above.
y modification in any of these designs
st be submitted to the office for approval.







— BUTTRESS J —



Bridge Plan
1" = 10'

MOHAWK HYDRO-ELECTRIC CO.

PECK'S LAKE DAM.

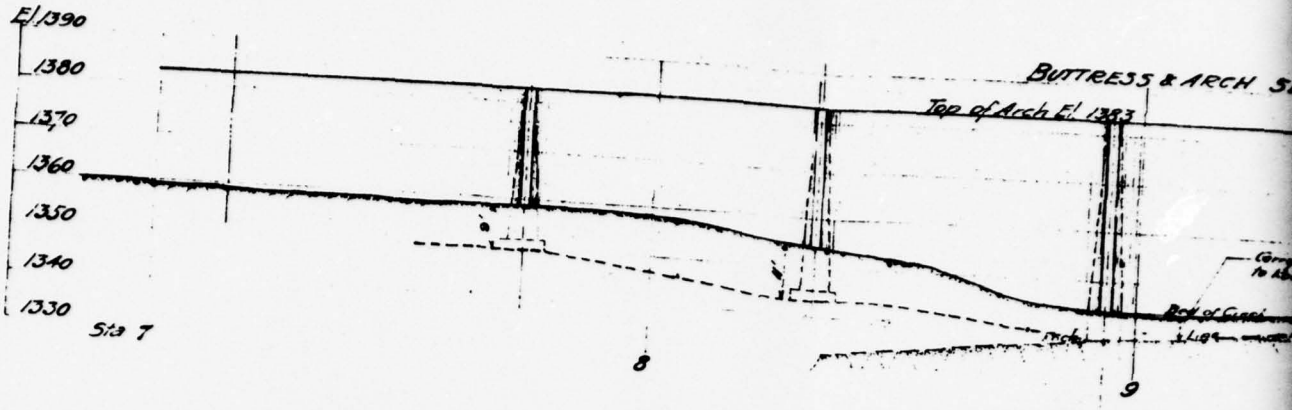
DETAILS. CONVERSE WARD DAVIS DIXON
Dec. 1910. CONSULTING ENGINEERS
PLATE IV SEPTEMBER 1978
Scale as noted

Wm. Barclay Parsons,
Consulting Engineers,
60, Wall St, New York.

Drawn by
Checked by
Approved

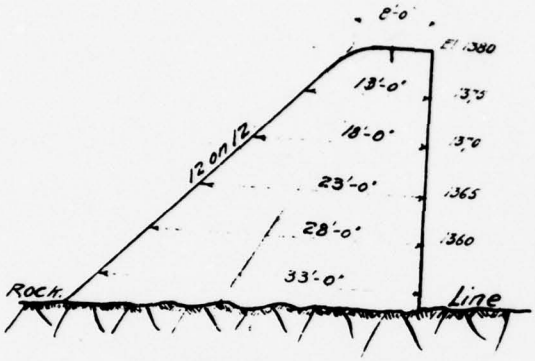
4 Mohawk

2

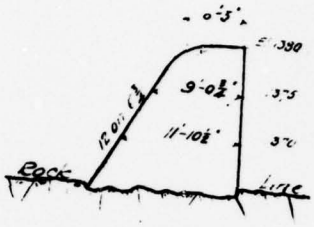


PROFILE

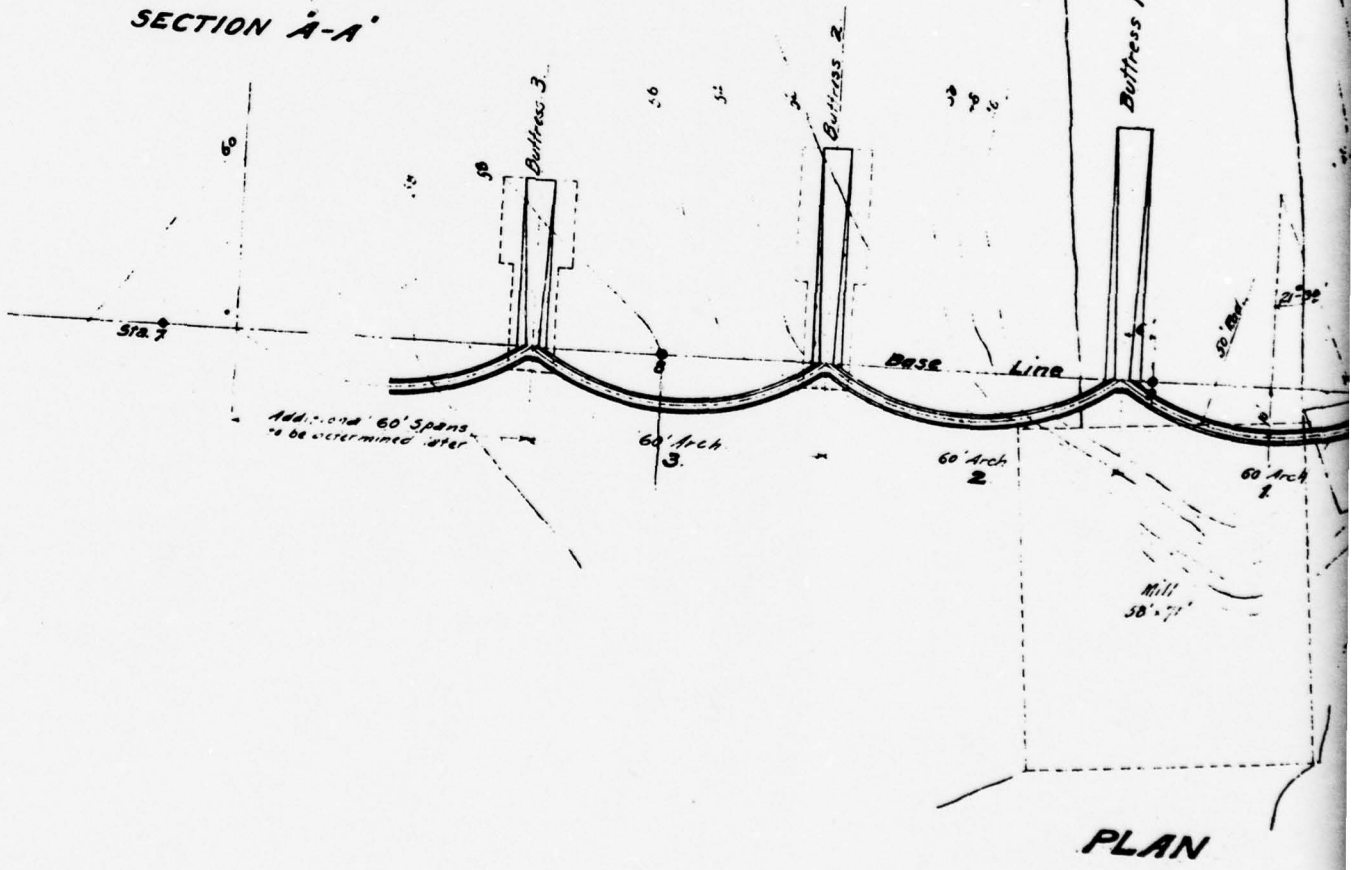
SCALE { Vertical / Horizontal } 1" = 20



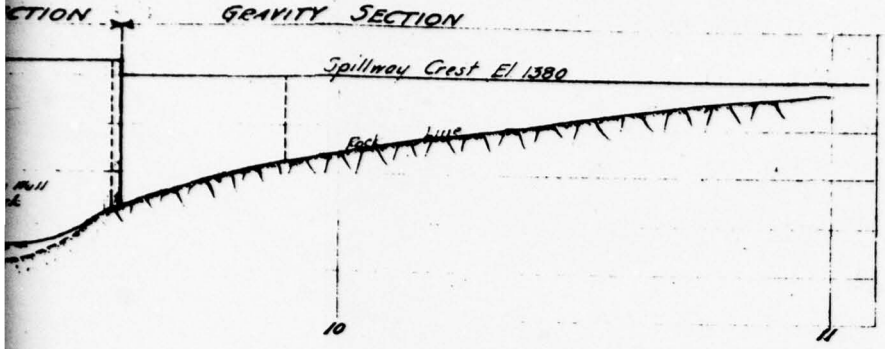
SECTION A-A'

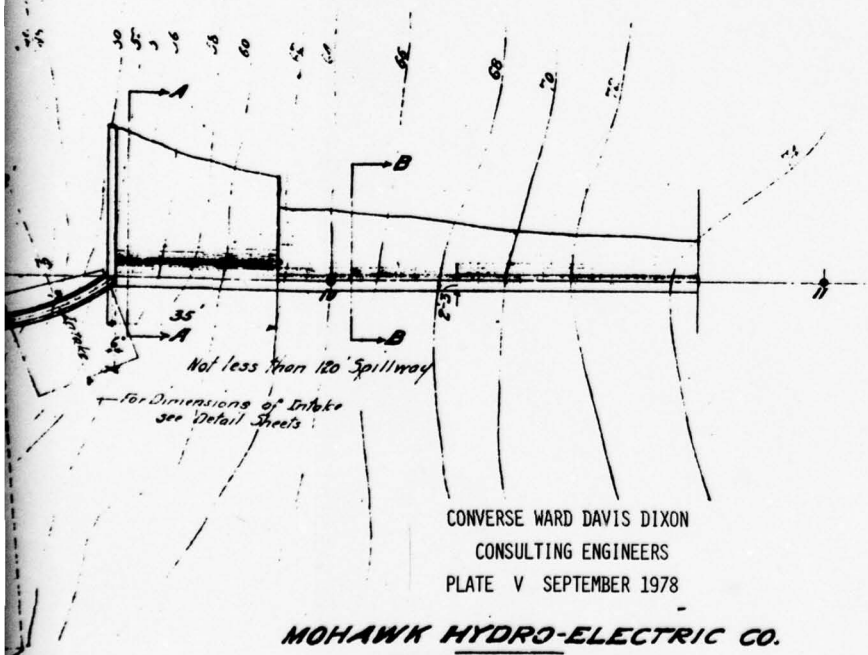


SECTION B-B'



PLAN





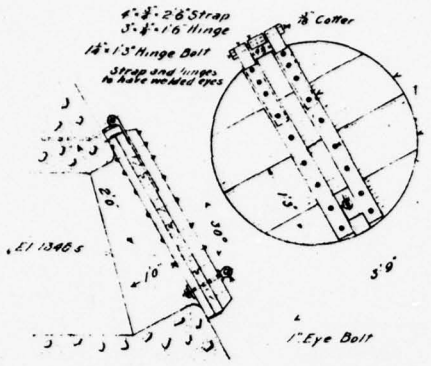
CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE V SEPTEMBER 1978

MOHAWK HYDRO-ELECTRIC CO.

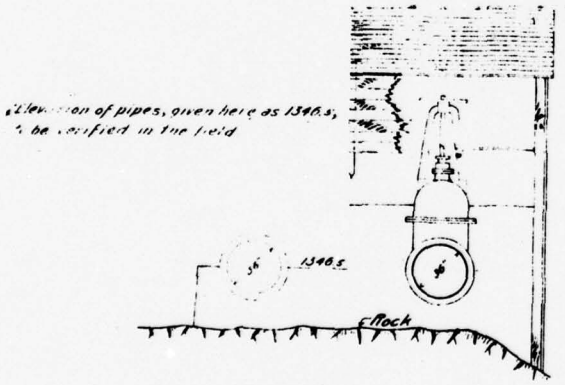
GENERAL LAYOUT
OF
INTAKE-AND SPILLWAY SECTION
FOR
PECK'S LAKE DAM

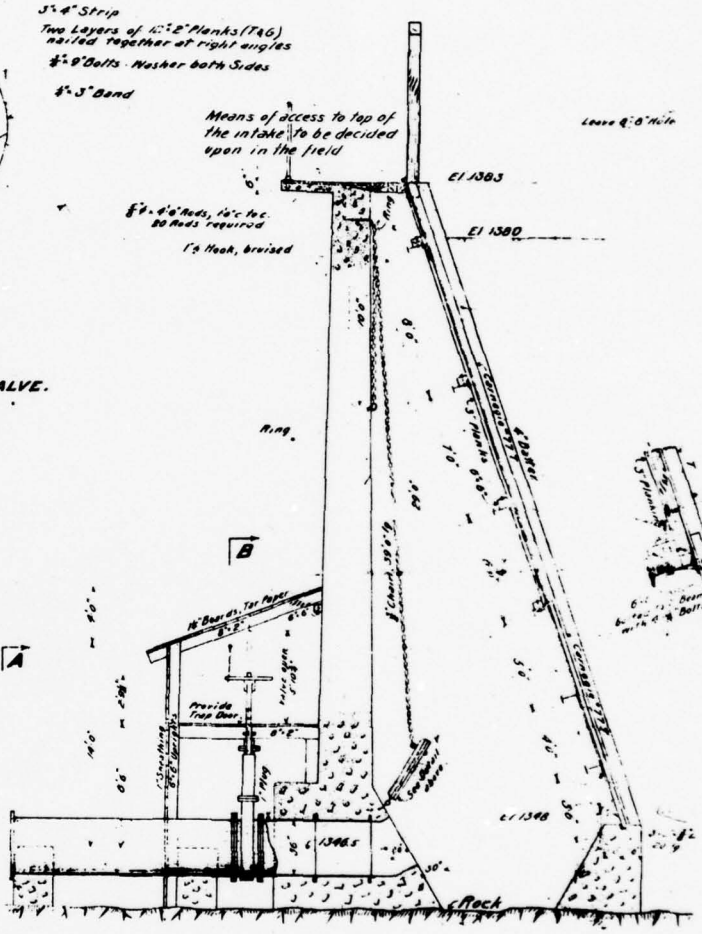
Wm. Barclay Parsons
Consulting Engineers
Cortlandt St. New York
Oct. 1910

2



DETAILS OF EMERGENCY VALVE.
Scale ¾"=1'0"





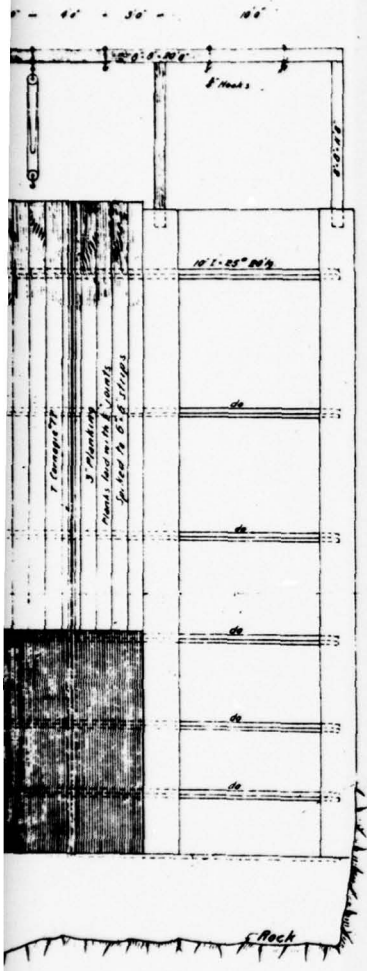
HALF VIEW A-A.

HALF SECTION B-B.

Scale ¾"=1'0"

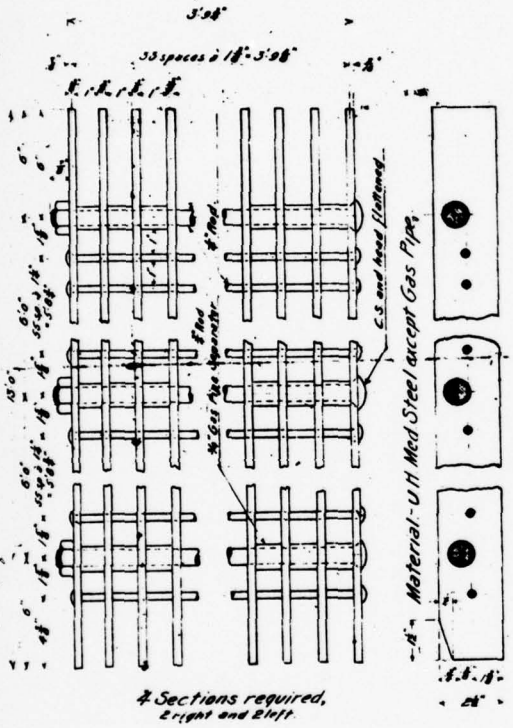
CROSS SECTION OF INTAKE.

Scale ¼"=1'0"



ELEVATION LOOKING DOWNSTREAM.

Scale 2" to 1'



DETAILS OF RACK.

3/8 of full size

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE VI SEPTEMBER 1978

MOHAWK HYDRO-ELECTRIC CO.

PECK'S LAKE DAM.

DETAILS OF INTAKE.

Oct. 1910.

Scales as noted.

Wm. Barclay Parsons,
Consulting Engineers,
60 Wall St., New York.

1

2

APPENDIX A

CHECKLIST - ENGINEERING DATA

CHECKLIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

NAME OF DAM: Peck Lake Dam NDS ID NO.: NY 166

RATED CAPACITY (ACRE-FEET) 23,170 NYS DEC ID NO.: 172-435

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1380.0

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1380.0

ELEVATION MAXIMUM DESIGN POOL: 1383.0

ELEVATION TOP DAM: 1383.0

CREST (SPILLWAY):

a. Elevation 1380.0
b. Type Concrete gravity
c. Width Top = 4.0'; Bottom = varies
d. Length 200 feet
e. Location Spillover Right of buttress section and left
f. Number and Type of Gates None of concrete dike

OUTLET WORKS:

a. Type Low level twin 36-inch steel pipes
b. Location In Arch No. 1
c. Entrance inverts 1345±
d. Exit inverts 1345±
e. Emergency draindown facilities These pipes are the only emergency draindown facilities.

HYDROMETEOROLOGICAL GAGES:

a. Type None
b. Location None
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: Unknown; 4100 cfs (estimated)

CHECKLIST

ENGINEERING DATA

DESIGN, CONSTRUCTION, AND OPERATION
PHASE I

NAME OF DAM: Peck Lake Dam

NDS ID NO.: NY166 NYS DEC ID NO.: 172-435

ITEM	REMARKS
DRAWINGS	A set of 5 design drawings are available. Three are dated Nov. 1910 and two are dated Oct. 1910. They are all prepared by Wm. Barclay Parsons, Consulting Engineers, 60 Wall St., New York. This set includes: (REFER TO SHEET 5)
REGIONAL VICINITY MAP	Dam-lake system shown on a combination of two USGS 7.5 minute Quadrangle Sheets of Peck Lake, N.Y. (N4300-W7422.5) and of Caroga Lake, N.Y. (N4307.5-W7422.5)
CONSTRUCTION HISTORY	No formal history of original construction available. Major repairs occurred in 1970, 1976 and 1977.
TYPICAL SECTIONS OF DAM	Available on 1910 drawings
HYDROLOGIC/HYDRAULIC DATA	Peck Lake storage capacity vs. elevation is the only hydrological data available. USACE Hydrologic Model for Mohawk River Basin was also used for hydrology computations. No hydraulic data available.

ENGINEERING DATA

ITEM	REMARKS
OUTLETS: Plan Details Constraints Discharge Ratings	Structural section on 1910 drawings available
RAINFALL/RESERVOIR RECORDS	Pool level recorded daily
DESIGN REPORTS	None available
GEOLOGY REPORTS	None available
DESIGN COMPUTATIONS: Hydrology & Hydraulics Dam Stability Seepage Studies	None available

ENGINEERING DATA

ITEM	REMARKS
MATERIALS INVESTIGATIONS Boring Records Laboratory Field	None available
POST-CONSTRUCTION SURVEYS OF DAM	Inspection by Mr. A. R. McKim dated Sept. 7, 1913. NYSDEC inspections dated Sept. 18, 1970 & Sept. 21, 1976. Other inspections apparently by NMPC dated July 31, 1968; Sept. 31, 1968; June 10, 1970; Sept. 10, 1970.
BORROW SOURCES	Applicable to earth dike. Not available.
MONITORING SYSTEMS	Pool level recorded daily.
MODIFICATIONS	Major repairs in 1970, 1976 and 1977. Photographs of repairs available with NMPC.

ENGINEERING DATA

ITEM	REMARKS
HIGH POOL RECORDS	High water mark 6 inches above spillway crest. Visual observation 4 inches above spillway crest in the past 14 years.
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available
PRIOR ACCIDENTS OR FAILURE OF DAM Description Reports	None reported
MAINTENANCE AND OPERATION RECORDS	Photographs of repairs done in 1970, 1976 and 1977 available with NMPC
SPILLWAY: Plan Sections Details	Plans, sections and details available on 1910 drawings

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT: Plans Details	Available on 1910 drawings
PREVIOUS INSPECTION Date: Findings	Inspections are performed periodically by NYSDEC and apparently by NMPC also. The latest reported one was on Sept. 21, 1976. Extensive concrete deterioration and seepage reported in NMPC reports (Appendix E).
DRAWINGS	General layout, profile and sections (Plate II); Elevation, plan and section of the intake structure (Plate III); Reinforcement details in the buttresses and arches (Plate IV); General layout of intake and spillway section (Plate V); Structural details of intake (Plate VI).

APPENDIX B

CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

NAME OF DAM: Peck Lake Dam County: Fulton State: New York NDS ID No.: NY 166

NYS DEC ID No.: 172-435

Type of Dam: Combination Concrete Arch, Gravity, Spillway & Dike Hazard Category: High

Date(s) Inspection: 30 July 1978 Weather: Hot - humid Temperature: 89°F

Pool Elevation at Time of Inspection: 1378.8 msl 50" below top of gravity section at left abutment

Tailwater at Time of Inspection: 1344.8 msl 2" below pipe invert - fluctuated to 2" above when they opened & closed the gates

Inspection Personnel:

E. A. Nowatzki (CWDD)	L. Pratt (NMPC)	
G. S. Salzman (CWDD)	S. McCoy (NMPC)	
R. Levett (NMPC)	J. Pickard (NMPC)	

E. A. Nowatzki (CWDD) Recorder

Remarks:

This structure underwent major repairs in 1976 (Arches 5 through 10), 1977 (Arches 1 through 4 and spillway) and 1970 (Arches 1 through 10?). Lake level was lowered 18'-20' in 1970 and 1976. Many photos available at NMPC of all repairs.

Mr. P. Gossen from Lev Zetlin Assoc., Inc., 95 Madison Ave., N.Y., N.Y. 10016 and Mr. R. Levett (NMPC) made an independent inspection of the dam on August 13, 1978.

CONCRETE/MASONRY DAMS

Sheet 1 of 4

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	No seepage through gravity section. Seepage occurs at junction of gravity section & 1st buttress. Seepage through all ten arch sections to (REFER TO SHEET 3)	Epoxy streams give appearance of seepage but in many areas there is none.
JUNCTION OF STRUCTURE WITH Abutment Embankment Other Features	Left abutment - OK Right abutment - dike extends into woods and higher ground OK	
DRAINS	None visible	
WATER PASSAGES	See "OUTLET WORKS" and "UNGATED SPILLWAY"	
FOUNDATION	Massive rock under spillway section and probably under gate house (Arch 1). Otherwise not visible.	

CONCRETE/MASONRY DAMS

Sheet 2 of 4

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SURFACES: Surface Cracks Spalling	Gravity section - major spalling & scaling to depth of 1" to 2". Signs of prior epoxy injection grouting. (REFER TO SHEET 4)	Many spalls in arch sections partially epoxied (injection) and/or concrete gunited.
STRUCTURAL CRACKING	Cracks to varying degrees in all sections. Suspect more hidden by gunite. Some have been epoxied.	
VERTICAL AND HORIZONTAL ALIGNMENT	Generally OK. Apparent bulge in Arch 1 about 1/3 of way up from base. May be due to gunite work. Top of arches irregular due to guniting.	
MONOLITH JOINTS	Many leaking. Some reconstructed with epoxy and styrofoam type seal.	
CONSTRUCTION JOINTS	Some badly deteriorated on buttresses and in arches.	
RECORDING INSTRUMENTATION	None	
OTHER	Stairs and guard rails on buttress between Arches 1 & 2 in good condition.	

CONCRETE/MASONRY DAMS

Sheet 3 of 4

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	varying degrees from minor to moderate. 7th arch whose downstream half was recently (1976) rebuilt is also leaking. Ground seepage downstream of some sections of arched part of dam starting with first buttress on left.	
	Ground seepage forms flowing stream along roadway that empties into gate discharge channel. Stream & associated swamp (cattails) bridged by wooden walkway between Arches 3 and 1. Considerable seepage in Arch 1 which contains gate	
	house. For seepage related to spillway section see "UNGATED SPILLWAY". Seepage under dike section suggested by swamp downstream. Heavy overhanging growth obstructs access on top of dike - should be removed. Short low earth berm at right end of dike looks OK	
	(right abutment). Heavy growth of shrubs and small trees at base of Arches 2 through 5.	

CONCRETE/MASONRY DAMS

Sheet 4 of 4

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SURFACES: Surface Cracks Spalling	Transverse, longitudinal and vertical surface cracks throughout. Buttress section - major spalling and scaling in all arches (in some sections up to 12" deep). Some buttresses badly spalled on construction joints and at	
	base. For spillway section see "UNGATED SPILLWAY". Dike section badly deteriorated.	

OUTLET WORKS

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Outlet is twin 36" diameter steel pipe. Pipes appear OK where visible at outlet.	
INTAKE STRUCTURE	Not visible - Emergency chain and flap gate closure appears satisfactory but was not tested.	
OUTLET STRUCTURE	Opened and closed both valves manually within 2 minutes - OK. Gate house is wood frame building apparently founded on rock located in Arch 1 - (REFER TO SHEET 2)	
OUTLET CHANNEL	Apparent natural channel, right side bedrock beyond which is concrete buttress. Left side is concrete buttress. Roadway bridge (REFER TO SHEET 2)	
EMERGENCY GATE	See "OUTLET STRUCTURE" above.	

OUTLET WORKS

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
OUTLET STRUCTURE	access via wooden walkway from road at toe of dam. Normal position of gate today - left gate open 10", right gate closed.	
OUTLET CHANNEL	about 100 feet downstream of discharge pipes - not expected to be obstruction.	

UNGATED SPILLWAY

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Crest generally in good condition. Gunite spall in one place - wire mesh exposed. Downstream face very severely spalled, some up to 2' deep (REFER TO SHEET 2)	
APPROACH CHANNEL	None	
DISCHARGE CHANNEL	Massive rock apron slanting down toward left to outlet discharge channel. Need to cut trees and brush at downstream side of right end of spillway to reopen side channel.	
BRIDGE AND PIERS	None	
ABUTMENTS	Left spillway abutment (buttress) has major spalls and toe erosion. Right abutment is dike - OK.	

UNGATED SPILLWAY

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	and supporting shrubs. This spall was deep enough and large enough to expose cyclopean concrete. Most water ever over spillway in 14 years was 4" (reported by operator) Moderate seepage through	
	and under spillway.	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	Lake level is monitored and recorded daily throughout year. Deed restriction limits elevation changes. Must be kept within 3 feet of spillway level from Memorial Day to Labor Day.	

RESERVOIR

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Variable - generally range from 2 horizontal to 1 vertical to 4 horizontal to 1 vertical. Some shallower along bay that extends to right. Roadway and grade surrounding bay checked	
	and found to be higher than top of dam.	
SEDIMENTATION	None visible - presumed minor.	

DOWNSTREAM CHANNEL

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION Obstructions Debris Other	None visible	
SLOPES Cover Stability	Heavily wooded - difficult to access. Seem stable.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	2 homes immediately below gravity and buttress (left) section of dam. Did not check further.	Concur with "high" hazard.

APPENDIX C

COMPUTATIONS

BY PGM 8/22/78 JOB A7805-11G
CHD BY JK 9/5/78 SHEET 1 OF 6

SUBJECT: HYDROLOGY - FLOOD ROUTING
PECK LAKE DAM

DRAINAGE AREA OF PECK'S LAKE DETERMINED FROM U.S.G.S. QUADRANGLE MAPS. AREA WAS PLANIMETERED = 130.79 in^2

CONVERSION 1 SQUARE MILE = 6.97 in^2

PECK LAKE DRAINAGE AREA = 18.76 mi^2 SAY 19 mi^2

AREA OF PECK LAKE = 15.06 in^2 CONVERTED TO mi. = 2.2 mi^2

USE UPPER HUDSON RIVER BASIN HYDROLOGICAL MODEL Pg 97-107

SUBDIVISION #22 AREA = 23 sq. mi. SPF(cfs) = 10655 cfs

FOR HIGH HAZARD DAM SDF = PMF = 2(SPF) = 21310

$$\therefore \left(\frac{A_1}{A_2}\right)^{3/4} = \frac{PMF_1}{PMF_2} \; ; \; \left(\frac{19}{23}\right)^{3/4} = \frac{PMF_1}{21310}$$

PMF FOR PECK'S LAKE = 18465 cfs.

TIME OF PEAK INFLOW FOR SUBDIVISION #22 = 9 hrs.

$A_1 = 19 = \frac{\pi}{4} d_1^2 \qquad d_1 = 4.9$

$A_2 = 23 = \frac{\pi}{4} d_2^2 \qquad d_2 = 5.4$

$T_{P_1} = \frac{d_1}{d_2} T_{P_2} = \frac{4.9}{5.4}(9) = 8.2$ hr.

$T_b = 2.67(T_{P_1}) = 21.8$ hrs. FROM DESIGN OF SMALL EARTH DAMS. by Bureau of Reclamation

BY: PGM 8/28/78
CKD BY JK 9/6/78

JOB: A7806-11G

SHEET 2 OF 6

SUBJECT: HYDROLOGY - FLOOD ROUTING
PECK LAKE DAM

DISCHARGE OVER SPILLWAY VS. POOL ELEVATION

ELEV.	Q cfs =	C L $H^{3/2}$
+1380	0	
1380.5	280	= 3.95 (2.0)(.5)$^{3/2}$
1381	790	= 3.95 (200)(1)
1382	2232	= 3.95 (200) $2^{3/2}$
1383	4105	= 3.95 (200) $3^{3/2}$

Note: No experimental data is available for coefficient C for the dimensions and shape of the broad crested weir under investigation. The assumed value 3.95 of the coefficient is for the ogee shape as recommended in "The Design of Small Dams" by the Bureau of Reclamation. This value appears to be unconservative for the particular crest but reducing the coefficient will only increase the inadequacy of the spillway which has already been found to be seriously inadequate.

EXCESS STORAGE (ACRE-FT) VS. ELEVATION (FT)

USE ELEVATION - VOLUME CURVES (Sheet #3)
DECEMBER 1971
PECK LAKE STORAGE

FOR REASONABLENESS CHECK

FOR $H_c = 3'$ VOL (ACRE-FT) = 2.2 sq. mi. $\left(640 \frac{\text{ac.-ft.}}{\text{sq. mi.}}\right) \times 3'$

ELEV. 1383 = 4224 ACRE-FT

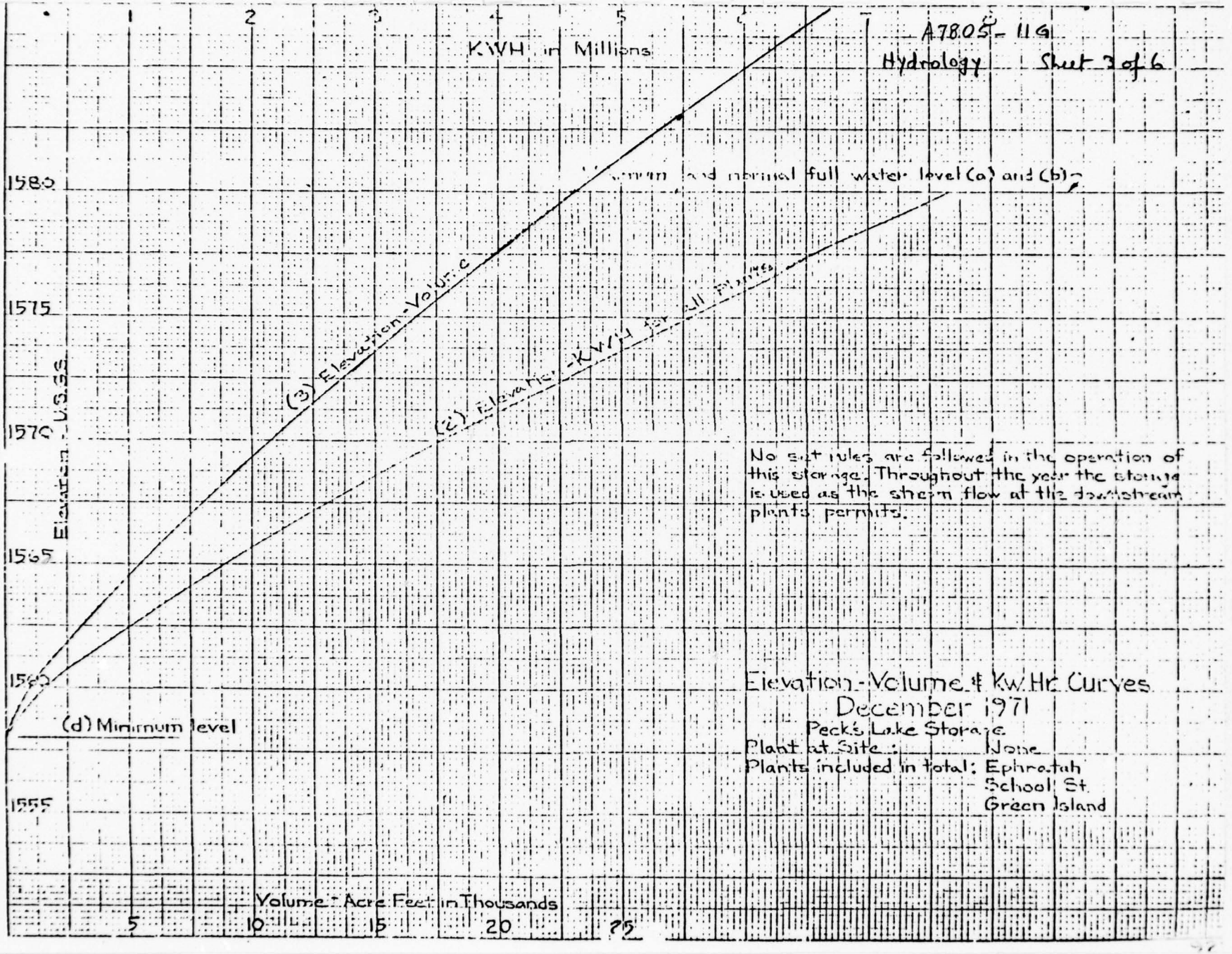
EXTRAPOLATING CURVES @ 1383 WE FIND THAT THE STORAGE IS 27.25 THOUSAND ACRE-FT - 23.17 THOUSAND ACRE-FT @ 1380

= 4.08 THOUSAND ACRE-FT $\cong$ 4.22 THOUSAND-ACRE-FT.

ELEV.	ΔS ACRE-FT			
1380			=	0
1381	24.50	- 23.17	=	1330
1382	25.85	- 23.17	=	2680
1383	27.25	- 23.17	=	4080

CONVERSE WARD DAVIS DIXON, INC.
91 ROSELAND AVENUE
P.O. BOX 91
CALDWELL, N.J. 07006

A7805-11G
Hydrology Sheet 3 of 6



...mum and normal full water level (a) and (b)

No set rules are followed in the operation of this storage. Throughout the year the storage is used as the stream flow at the downstream plants permits.

Elevation - Volume & KW Hr Curves
December 1971
Peck's Lake Storage
Plant at Site: None
Plants included in total: Ephrata
School St.
Green Island

BY PGM 8/22/78
CHK JK 9/6/78

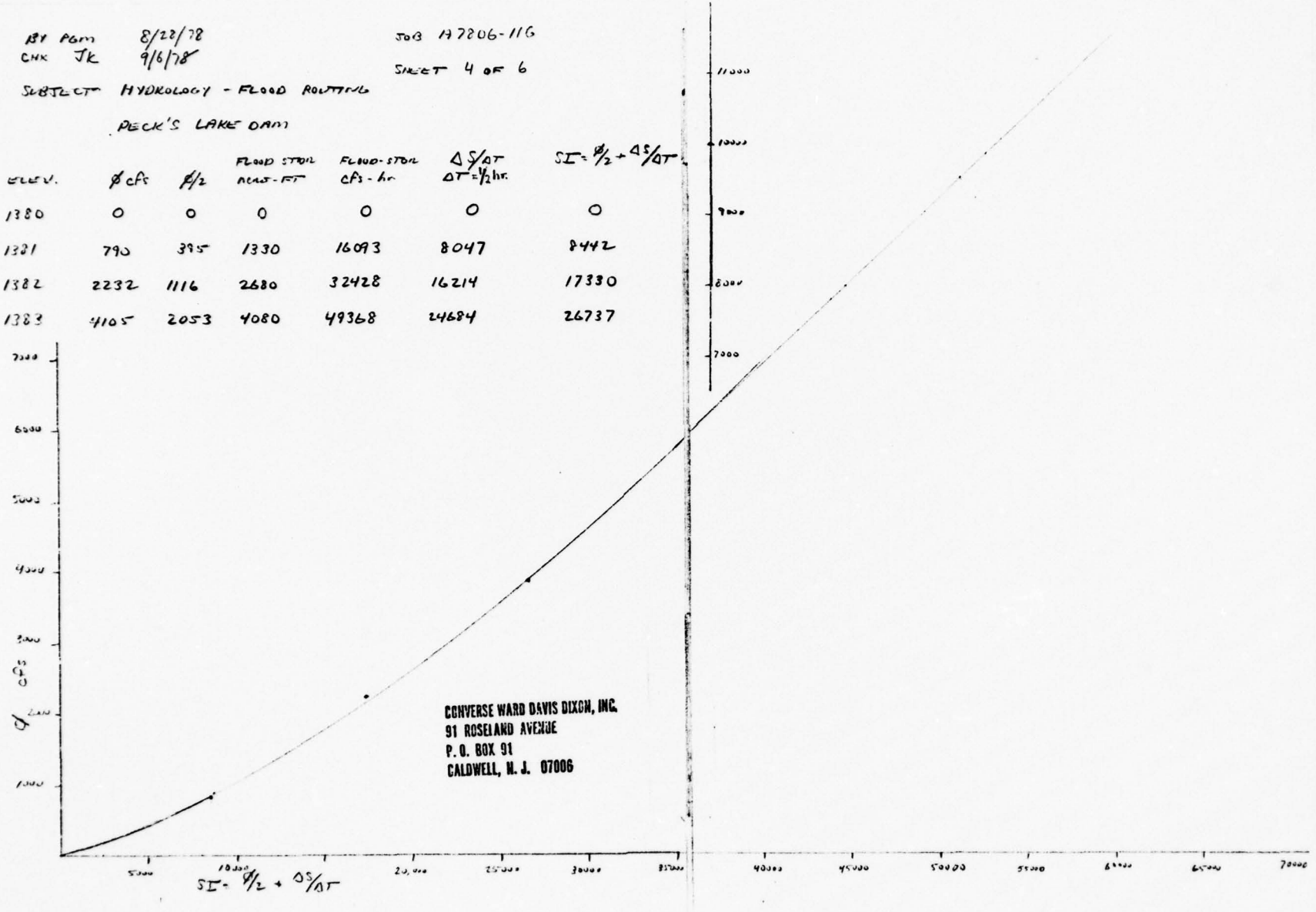
JOB 17806-116

SHEET 4 OF 6

SUBJECT HYDROLOGY - FLOOD ROUTING

PECK'S LAKE DAM

ELEV.	Ø cfs	Ø/2	FLOOD STOR ACRE-FT	FLOOD-STOR cfs-hr	ΔS/ΔT ΔT=½hr.	SI = Ø/2 + ΔS/ΔT
1380	0	0	0	0	0	0
1381	790	395	1330	16093	8047	8442
1382	2232	1116	2680	32428	16214	17330
1383	4105	2053	4080	49368	24684	26737



BY: PGM JOB: A7806-11G

CHKD JK 9/6/78 SHEET 5 OF 6

SUBJECT: HYDROLOGY - FLOOD ROUTING

PECK'S LAKE DAM

C... E... WARD DAVIS DIXON, INC.
91 K...LLARD AVENUE
P.O. BOX 91
CALDWELL, N.J. 07006

TIME	I cfs	$\bar{I}$	SI_N	ϕ_N	$(SI)_N - \phi_N + \bar{I}_{(N+1)} = (SI)_{N+1}$
0	0	0	0	0	0 - 0 + 2300 = 2300
2	4600	2300	2300	185	2300 - 185 + 6850 = 8965
4	9100	6850	8965	900	8965 - 900 + 11400 = 19,465
6	13700	11400	19465	2550	19465 - 2550 + 15950 = 32,865
8	18200	15950	32865	5250	32865 - 5250 + 17050 = 44,665
10	15900	17050	44665	8000	44665 - 8000 + 14550 = 51,215
12	13200	14550	51215	9525	51215 - 9525 + 11850 = 53,540
14	10500	11850	53540	10075	53540 - 10075 + 9150 = 52,615
16	7800	9150	52615	9875	52615 - 9875 + 6450 = 49,190
18	5100	6450	49190	9050	49190 - 9050 + 3750 = 43,890
20	2400	3750	43890	7825	43890 - 7825 + 1200 = 37,265
22	0	1200	37265	6300	

FOR HEIGHT OF WATER OVERTOPPING DAM

$$Q = CLH^{3/2}$$

$$10,200 = 3.95(200)H^{3/2}$$

$$H^{3/2} = 12.91$$

$H = 5.5'$ ∴ THIS WILL OVERTOP THE DAM BY 2.5'

% OF SDF THAT CAN BE PASSED IS:

$$\frac{4105}{10,200} \times 100 = 40.2\%$$

4105 ← MAX DISCHARGE OF SPILLWAY

10,200 ← PEAK OUTFLOW FOR PMF

Discharge through twin 36 inch diameter outlet pipes $= 2A\sqrt{2gh}$

$A = \frac{\pi}{4}(3)^2 = 7.07\ ft^2$, $h = 1383 - 1346.5 = 36.5\ ft$

∴ Outlet discharge $= 2 \times 7.07\sqrt{2 \times 32.2 \times 36.5} \simeq 690$ cfs (Neglect head loss because the pipes are only about 20 ft. long)

∴ % SDF that can be passed $= \frac{4105 + 690}{10200} \times 100 = 47\%$

BY PGM Checked by J.K. 9/6/78

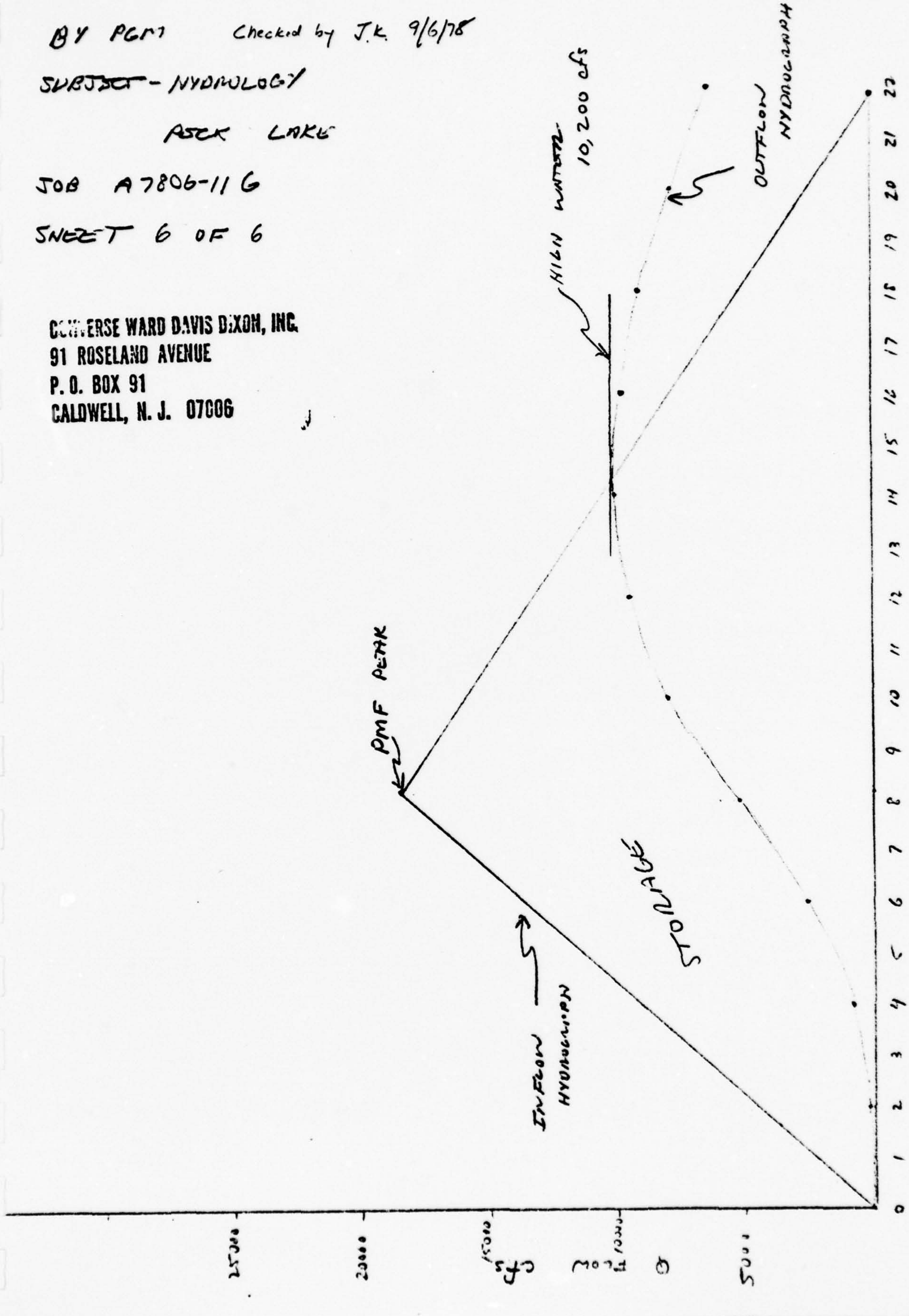
SUBJECT - HYDROLOGY

ASCK LAKE

JOB A7806-11 G

SHEET 6 OF 6

CONVERSE WARD DAVIS DIXON, INC.
91 ROSELAND AVENUE
P. O. BOX 91
CALDWELL, N. J. 07006



LEV ZETLIN ASSOC., INC.
CONSULTING ENGINEERS
95 MADISON AVE., N.Y.C. 10016

PROJECT: Public's Lake

BY: RDS
SHEET 1
DATE 8/9/78

$R = 50'$

$c = 60'$

$\alpha = \frac{A}{2}$

$b = r - \frac{1}{2}\sqrt{4r^2 - c^2} = 50 - \frac{1}{2}\sqrt{4(50)^2 - 60^2} = 10 \text{ ft}$

$= \frac{c}{2}\tan\frac{A}{4} = 10' \Rightarrow \tan\frac{A}{4} = \frac{2 \cdot 10}{c} = .333$

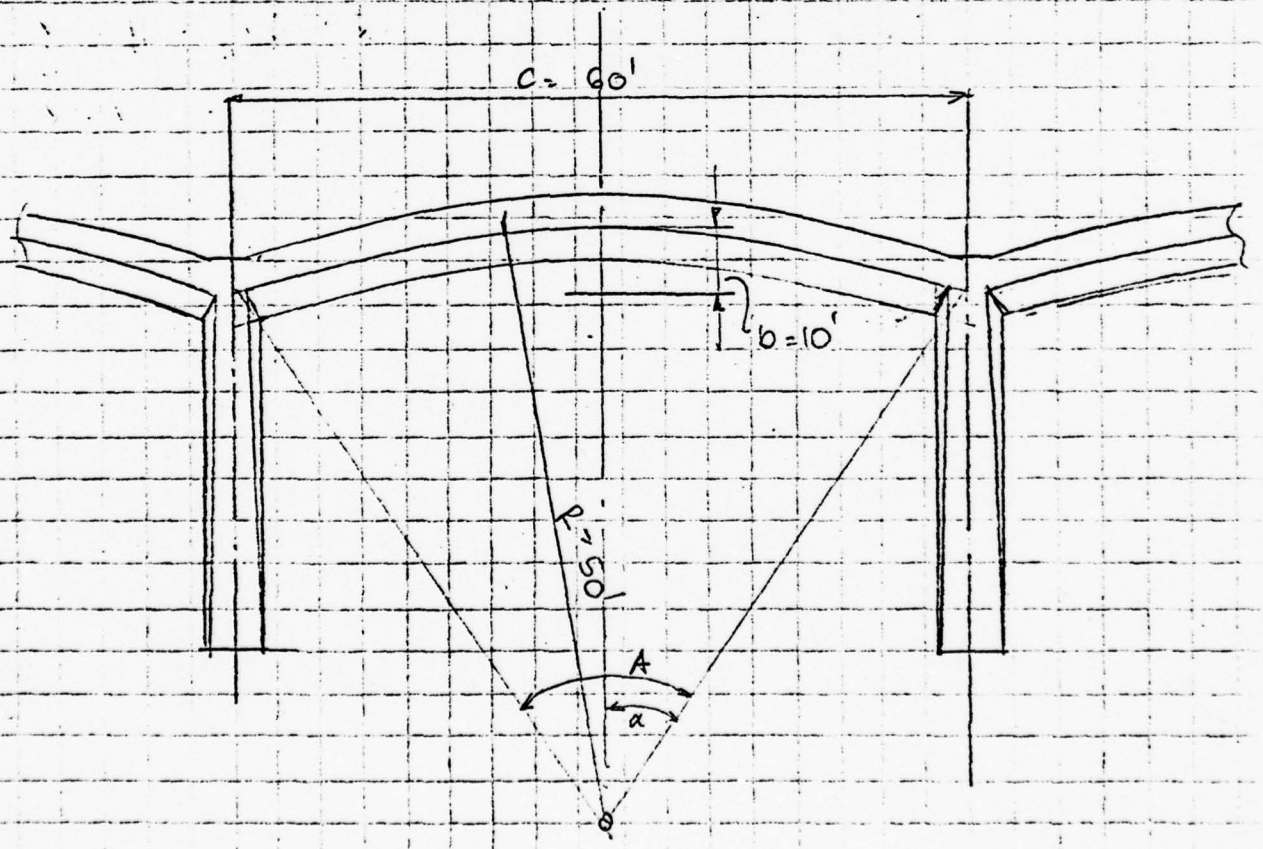
$\frac{A}{4} = .3218$

$\frac{A}{2} = .6436 \text{ rad}$

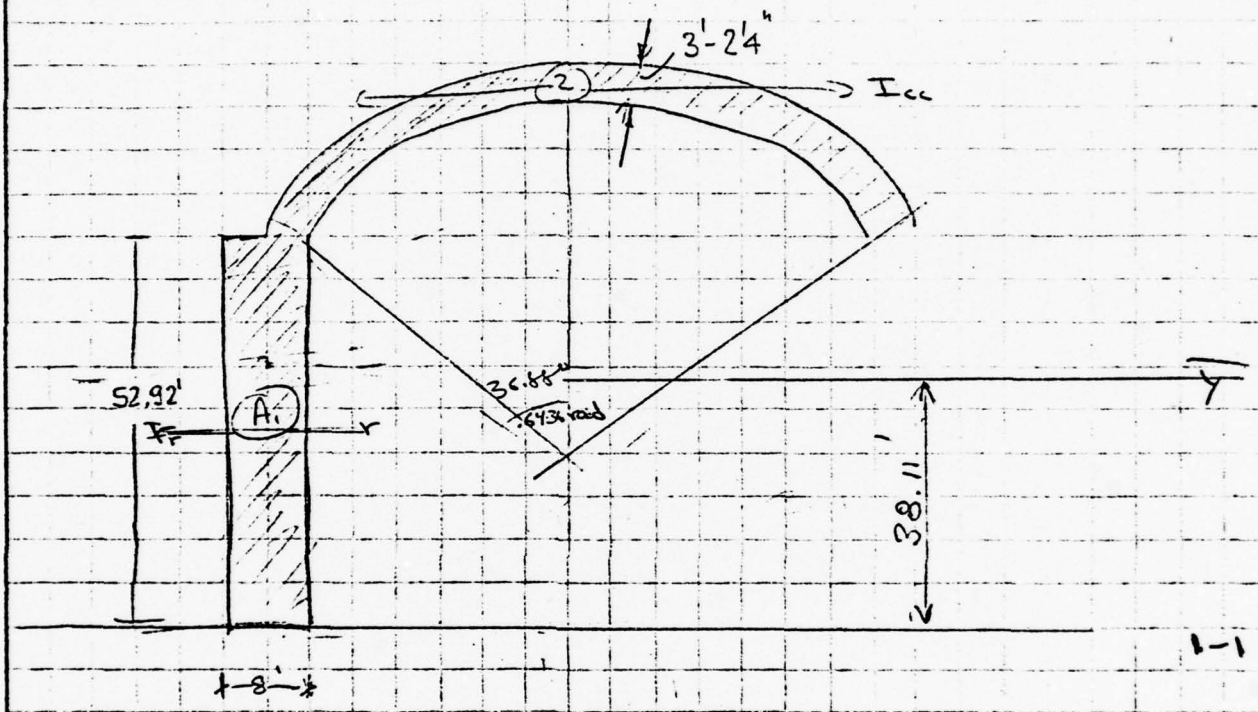
$= 36.88^\circ$

$A = 1.2872 = 73.75^\circ$

$\alpha = 36.88^\circ = .6436 \text{ rad}$



Buttress A



$A_1 = 423.36'$

$A_2 = \alpha t(2R-t) = (.6436)(3.19)(2(50)-(3.19)) = 198.76\ ft^2$

$A_T = 622.12$

$y_1 = 26.46'$

$y_2 = 62.92$

$\bar{y} = 38.11$

$\therefore I_{rr} = \frac{bd^3}{12} = \frac{8(52.92)^3}{12} = 198803\ ft^4$

For moment of inertia formulae refer to "Engineering Formulae" by Gieck

$$I_{cc} = R^3 t\left[\left(1-\frac{3t}{2R}+\frac{t^2}{R^2}-\frac{t^3}{4R^3}\right)\times\left(\alpha+\sin\alpha\cos\alpha-\frac{2\sin^2\alpha}{\alpha}\right)\right.$$
$$\left.+\frac{t^2(\sin^2\alpha)}{3R^2\alpha(2-t/R)}\left(1-\frac{t}{R}+\frac{t^2}{6R^2}\right)\right]$$

$$= 50^3(3.19)\left[\left(1-\frac{3(3.19)}{2(50)}+\frac{(3.19)^2}{(50)^2}-\frac{(3.19)^3}{4(50)^3}\right)\left(.6436+\sin(.6436)\cos(.6436)-\frac{2\sin^2(.6436)}{.6436}\right)\right.$$
$$\left.+\frac{(3.19)^2(\sin^2.6436)}{3(50)^2(.6436)\left(2-\frac{3.19}{50}\right)}\left(1-\frac{3.19}{50}+\frac{(3.19)^2}{6(50)^2}\right)\right]$$

$$= 50^3(3.19)\left[(.91)(4.63\times10^{-3})+(3.92\times10^{-4})(.94)\right] = 18228\ ft^4$$

LEV ZETLIN ASSOC., INC.
CONSULTING ENGINEERS
95 MADISON AVE., N.Y.C. 10016

PROJECT: PECK LAKE DAM

BY: RDS
SHEET 3
DATE 8/9/78

$I_{yy} = 98803 + 1822 + (423.36)(11.65)^2 + (198.76)(24.81)^2$
$= 280,428 \text{ ft}^3$

$c_{earth} = 26.41$

$c_{conc} = 38.11$

c = eccentricity

$S_{earth} = 10618 \text{ ft}^3$

S = section modulus = $\frac{I_{yy}}{c}$

$S_{batt} = 7358 \text{ ft}^3$

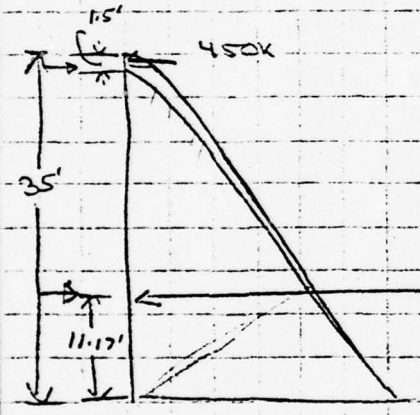
LEV ZETLIN ASSOC., INC.
CONSULTING ENGINEERS
95 MADISON AVE., N.Y.C. 10016

PROJECT: PECK LAKE DAM

BY: RDS
SHEET 4
DATE 8/9/78

Ice = 7.5 K/FT × 60 Ft = 450K ✓

Water = $\frac{33.5^2 \times .0624 \times 60}{2}$ = 2100K ✓



$\Sigma M_{@base}$ = 2100(11.17) + 450(34.25) = 38870 k-FT ✓

Volume of Buttress:

(49.59)·(33.49)	=	1661
(42.92)·(30.89)	=	1326
(36.25)(28.28)	=	1025
(29.59)(25.68)	=	760
(22.92)(23.07)	=	529
(16.25)(20.47)	=	333
(7.59)(27.33)	=	207
(33.45)(55.58)	=	1859
		7700ft³

Volume of Arch:

length of arc = 63.25'
Area of Arch = 132 ft²
Volume = 8349 ft³

72.2827

Volume of dam = 16050 ft³
Weight = 16050 ft³ · 150 #/ft³ = 2410 K

$\frac{P}{A} = 3.87 \ K/ft^2$ where $P = 2410\ K$ & $A = 622.12$

$\frac{M}{S_{anch}} = 3.66 \ K/ft^2$ $\quad \frac{P}{A} - \frac{M}{S_{anch}} = 3.87 - 3.66 = 0.21$ ∴ under comp

$\frac{M}{S_{but}} = 5.28 \ K/ft^2$ $\quad$ Max. compression $= \frac{P}{A} + \frac{M}{S_{buttress}} = 3.87 + 5.28 = 9.15$

Shear $= \frac{Horiz}{Area} = \frac{2550}{423} = 6 \ K/ft^2$ → Assuming shear is taken by the buttress only.

@ Buttress D

Arch same as before but $t = 3$

$$I_{cc} = (50)^3(3)\left[\left(1 - \frac{3(3)}{100} + \frac{9}{(50)^2} - \frac{27}{4(50)^3}\right)\left(.6436 + \sin(6436)\cos .6436 - \frac{2\sin^2(.6436)}{.6436}\right) + \frac{9(\sin^2(.6436))}{3(50)^2(.6436)(2-\frac{3}{50})}\left(1 - \frac{3}{50} + \frac{9}{6(50)^2}\right)\right]$$

$$= 37500c\left[(.91)(4.63\times10^{-3}) + (3.46\times10^{-9})(.94)\right]$$

$$= 1707\ ft^3$$

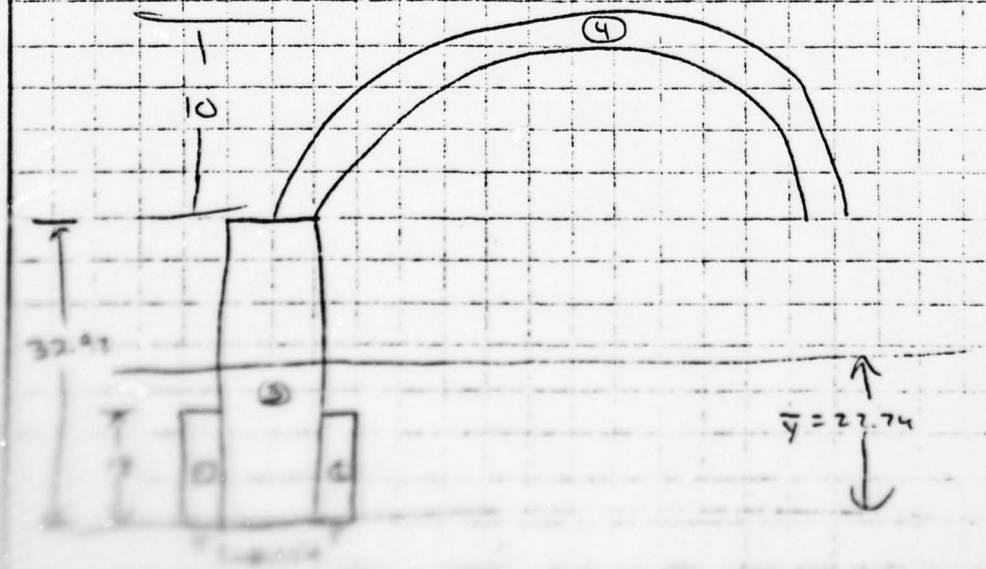
$A_1 = 90$ $\quad y_1 = 9$

$A_2 = 90$ $\quad y_2 = 9$

$A_3 = 208.5$ $\quad y_3 = 16.46$

$A_1 = \alpha t(2R-t) = (.6436)(3)(100-3) = 187.3$ $\quad A_4 = 187.3$ $\quad y_4 = 42.92$

$A_T = 575.8$ $\quad \bar{y} = 22.74$



LEV ZETLIN ASSOC., INC.
CONSULTING ENGINEERS
95 MADISON AVE., N.Y.C. 10016

PROJECT: PIER 17 EAST RIVER

BY: RDS
SHEET 7
DATE 8/10/78

$$I_{cg} = 1707 + (187.3)(20.18)^2 + \frac{(6.33)(37.92)^3}{12} + (208.5)(6.28)^2 + 2\left(\frac{5(18)^3}{12} + (13.74)^2(90)\right)$$

$$= 273{,}015 \text{ ft}^4$$

$C_{arch} = 21.68$

$C_{butt} = 22.74$

$S_{arch} = 12{,}593 \text{ ft}^3$

$S_{butt} = 12006 \text{ ft}^3$

Volume of Arch: length of arc = 63.25'

Area of Arch = $\frac{(2+3)}{2}(33) = 82.5'$

Volume = 5218 ft³

Volume of Buttress:

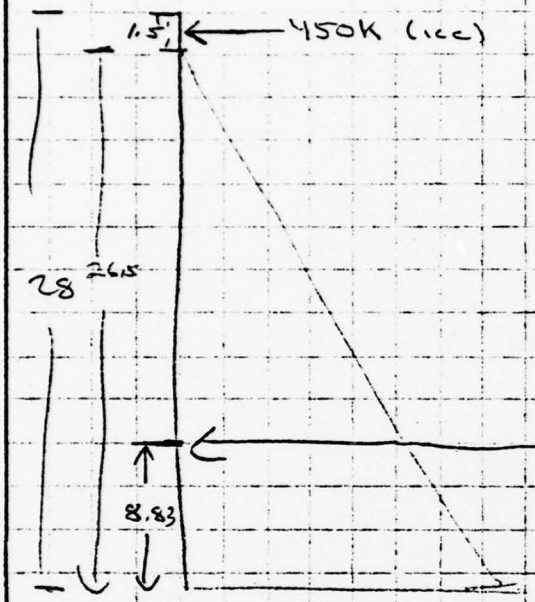
Elev	length	ave. length	Area	Volume
1383	2.25	7.59	27.33	207.4
1375	12.92	16.25	20.47	332.6
1370	19.58	22.92	23.07	528.8
1365	26.25	29.59	25.68	759.9
1360	32.92	36.25	28.28	1024.1
1355	39.58	42.92	30.89	1325.8
1350	46.25			4178.6 ft³

TOTAL

plus wings Vol. = 2(5)(3)(18) = 540 ft³

TOTAL VOLUME = 9937 ft³

TOTAL WEIGHT = 1491 k



$$\frac{(26.5)^2(.0624)(60)}{2} = 1315\ K$$

$$\Sigma M_{@\ base} = 1315(8.83) + 450(27.25) = 23,874\ K\text{-}FT$$

$$\frac{P}{A} = \frac{1491\ K}{5758\ ft^2} = 2.59\ ^{K}/_{ft^2} \cdot \frac{ft}{12}$$

$$\frac{M}{S_{arch}} = \frac{23874}{12593} = 1.9\ ^{K}/_{ft^2}$$

$$\frac{M}{S_{Stat}} = \frac{23874}{12006} = 1.99\ ^{K}/_{ft^2}$$

$$\text{Shear} = \frac{\text{Horiz. Force}}{\text{Area}} = \frac{1765\ K}{388.5} = 4.54\ ^{K}/_{ft^2}$$

SAFETY FACTORS

1) AGAINST OVERTURNING.
SINCE ALL THE FOOTING IS UNDER COMPRESSION UNDER WORST LOADING (ICE + WATER PRESSURE) THE SAFETY AGAINST OVERTURNING IS LARGER THAN 1.5.

2) AGAINST SLIDING:

PIER @ ARCH 1 & 2

TOTAL HOR?. SHEAR AT PIER. (PAGE 4)

$V = 2100 + 450 = 2550$ K.

RESISTANCE: PASSIVE EARTH PRESSURE + FRICTION;

ARCH IS EXTENDING 7'-0 INTO GROUND. BEARING ON ROCK

$Y_p = .120 \times \frac{7^2}{2} \times 5 \times 60' = 882.$ KIPS

WEIGHT OF PIER + ARCH = 2410 K

μ of CONCRETE AND ROCK = ~.6

$V_f = 2410 \times .6 = 1446.$ K

PIER IS 8' WIDE AND BITES 4'-0 INTO ROCK.

BEDROCK BEARING SAY 5 TONS/FT^2

$Y_b = 4 \times 8 \times 10 = 320$ KIPS

LEV ZETLIN ASSOC., INC.
CONSULTING ENGINEERS
95 MADISON AVE., N.Y.C. 10016

PROJECT: PECK CREEK DAM

BY: DAG
SHEET 10
DATE

PIER AT ARCH 4 & 5

SHEAR V (PAGE 8) = 450 + 1315 K = 1765 K.

ARCH IS EXTENDING 6'-0 INTO GROUND:

$V_p = 6^2 \times \frac{.120}{2} \times 5 \times 60 = 648$ K.

WEIGHT OF ARCH + PIER = 1491 K.

FRICTION OF SOIL = .5

$V_f = 1491 \times .5 = 745$ K.

PASSIVE PRESSURE AT PIER HEAD; 8'-0 DEEP

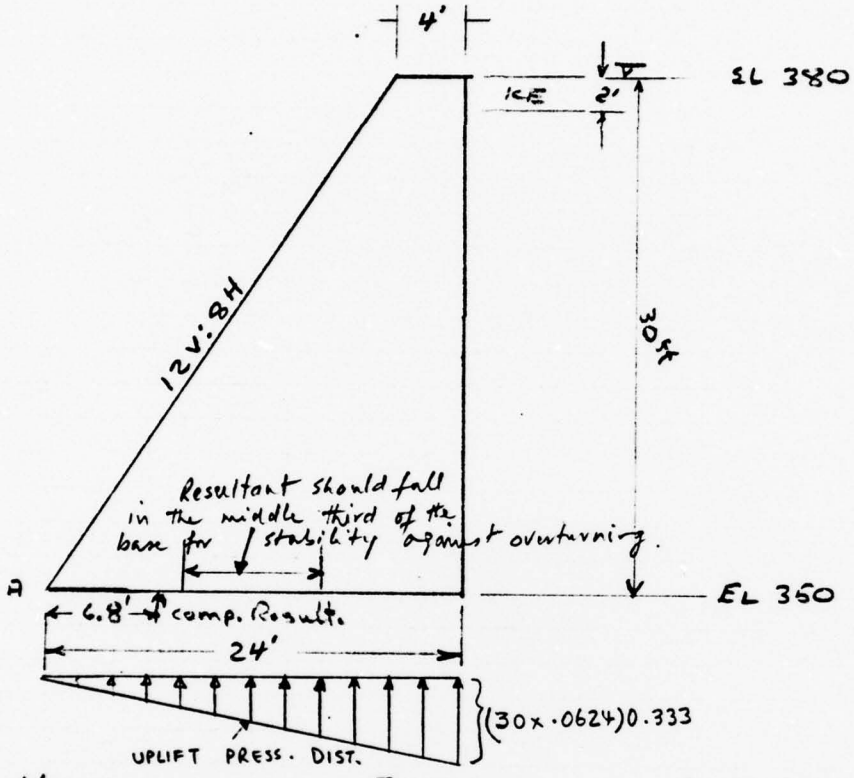
$V_{pp} = \frac{8^2 \times .120}{2} \times 5 \times 16 = 307$ K.

$\Sigma V = 648 + 745 + 307 = 1700 \approx 1765$ KIPS

BY DRR DATE 21 Sep.
CHKD. BY JK DATE 9/22/78
SUBJECT Stability of gravity spillway

JOSEPH S. WARD
91 ROSELAND AVE. CALDWELL, N. J.

SHEET NO. 1 OF 4
JOB NO. A7805-11G



Cross-section is based on Section Y-Y of Plate II

Item	FORCE (kips)	Lever arm (ft)	Moment about A (k-ft)
Water Pressure	$\frac{0.0624 \times (30^2 - 2^2)}{2} = 27.95$	= 10'	- 279.5
Ice	7.5	29	- 217.5
Spillway	$30 \times 4 \times 0.150 = 18$ $20 \times \frac{30}{2} \times 0.150 = 45$	22 $2 \times 20/3$	396 600
Uplift (assume 33%)	$30 \times 0.0624 \times \frac{24}{2} \times 0.333 = 7.48$	$\frac{2}{3} \times 24$	- 119.7

If $\bar{x}$ is the distance of resultant from A along Base, then

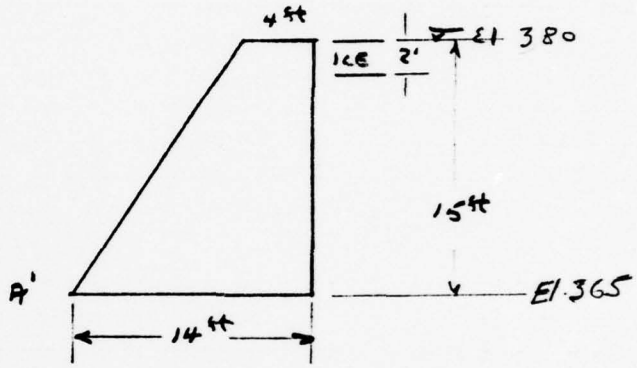
$(18 + 45 - 7.48)\bar{x} = 396 + 600 - 279.5 - 217.5 - 119.5$

$\bar{x} = \frac{379.3}{55.5} = 6.8 \text{ ft} < \frac{24}{3}$ ∴ Resultant outside middle 1/3 - unsafe

Net downward Force = 18 + 45 - 7.48 = 55.5

$$F.S.\ \text{SLIDING} = \frac{55.5\,(\mu)}{27.96 + 7.5} = \frac{55.5 \times 0.6}{35.45} = 0.94 \therefore \text{unsafe}$$

AVERAGE SECTION



Item	Force (Kips)	arm (ft)	Moment about A' (K-ft)
Water Press.	$0.0624 \times \frac{(15^2 - 2^2)}{2} = 6.90$	5^{ft}	- 34.5
ICE	7.5	14^{ft}	- 105.0
Spillway	$15 \times 4 \times 0.150 = 9$	12^{ft}	+ 108
	$15 \times \frac{10}{2} \times 0.150 = 11.25$	$\frac{2}{3}(10)$	+ 75
Uplift (33%)	$0.0624 \times 15 \times \frac{14}{2} \times 0.33 = 2.16$	$\frac{2}{3}(14)$	- 20.18

$$(9 + 11.25 - 2.16)\,\bar{x} = 108 + 75 - 34.5 - 105 - 20.18$$

$$\bar{x} = \frac{23.32}{18.09} = 1.3^{ft} < \frac{14}{3} \therefore \text{Unsafe against overturning.}$$

Net down Force = 9 + 11.25 - 2.16 = 18.09

$$F.S.\ \text{sliding} = 18.09(0.6)/(6.9 + 7.5) = 0.75 \therefore \text{Unsafe}$$

BY DRR DATE 21 Sept
CHKD. BY JK DATE 9/22/78
SUBJECT stability of the gravity spillway

JOSEPH S. WARD
91 ROSELAND AVE. CALDWELL, N. J.

SHEET NO. 3 OF 4
JOB NO. A7805-11C

Stability at max. pool - water el. @ 1383

Deep Section (pg 1)

Item	Force (kips)	Arm (ft)	Moment about Toe (k-ft)
water press.	$0.0624\left(\frac{33^2-3^2}{2}\right) = 33.7$	= 11 ft	- 370.7
Spillway	18	22	+ 396
	45	$2 \times 20/3$	+ 600
Uplift	$33 \times 0.0624 \times \frac{24}{2} \times 0.333 = 8.23$	$\frac{2}{3}(24)$	- 131.7

$$\bar{x} = \frac{600 + 396 - 370 - 131.7}{18 + 45 - 8.23} = \frac{494.3}{54.8} = 9.02^{ft} > \frac{24}{3} \therefore \text{ok}$$

resultant within middle 1/3 of Base -

Net downward Force = 18 + 45 - 8.23 = 54.8

F.S. sliding = $\frac{54.8(0.6)}{33.7} = 0.98 \therefore$ Unsafe

Average Section (Pg 2)

water Press	$\frac{0.0624(18^2-3^2)}{2} = 9.83$	6 ft	- 58.97
Spillway	9	12 ft	+ 108.0
	11.25	20/3	+ 75
Uplift	$0.0624(18)\left(\frac{14}{2}\right) \times 0.333 = 2.62$	28/3	- 24.4
			99.63

BY DRR DATE 21 Sept

CHKD. BY J.K. DATE 9/22/78

JOSEPH S. WARD
91 ROSELAND AVE. CALDWELL, N. J.

SHEET NO. 4 OF 4

JOB NO. A7805-11C

SUBJECT Stability of the gravity Spillway

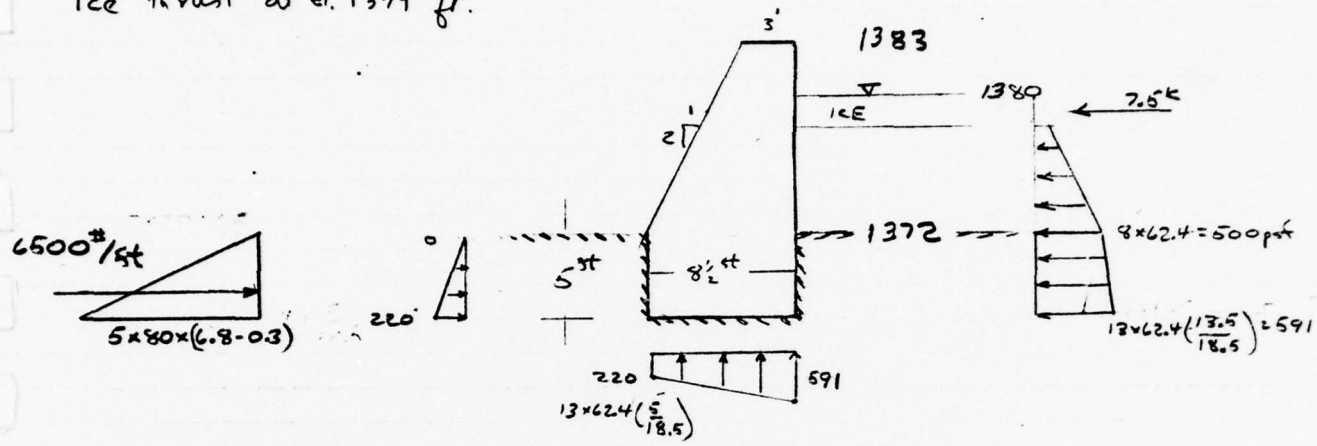
Resultant $\bar{x} = \dfrac{99.63}{9+11.25-2.62} = 5.65^{ft} > \dfrac{14}{3}$ ∴ ok for overturning

Net downward force $= 9+11.25-2.62 = 17.63$

F.S. Sliding $= \dfrac{17.63(0.6)}{9.83} = 1.07$ ∴ unsafe for sliding.

BY DGR DATE 9/20/78 | JOSEPH S. WARD | SHEET NO. 1 OF 2
CHKD. BY JK DATE 9/22/78 | 91 ROSELAND AVE. CALDWELL, N. J. | JOB NO. A 7805-116
SUBJECT GRAVITY WALL STABILITY ANALYSIS

Water at El. 1380 ft.
Ice thrust at El. 1379 ft.



ITEM	Force		arm	Moment
WATER Pressure above Mudline	$-\frac{62.4\times(8^2-2^2)}{2}=-1872$		$5+\frac{8}{3}=7.67$	-14,352
below Mudline	-500×5	-2500	2.5	-6250
	$-91\times5/2$	-227.5	5/3	-380
	$+200\times5/2$	+500	5/3	+833
		-2227.5		
CIE	-7500#		12 (1ft. below 1380)	-90,000
Wall	$+3\times16\times150=7200$		5.5+1.5	+50,400
	$+5.5\times5\times150=4125$		5.5/2	+11,343
	$+5.5\times11/2\times150=4538$		$5.5\times2/3$	+16,638
Uplift	$-220\times8.5=-1870$		4.25	-7948
	$-371\times8.5/2=-1577$		$2\times8.5/3$	-8935
Passive	$5\times80\times(6.8-0.3)\times5/2=6500$		5/3	+10,834
				-37816

$(15,863-3447)\bar{x} = -37,816$

$\bar{x} = -\frac{37816}{12416} = -3.0'$. Outside the base of the wall. Therefore, unsafe

Downward Forces: $7200+4125+4538-1870-1577=12,416$

Horiz Forces $= -7500+6500-2227.5-1872=5100$#

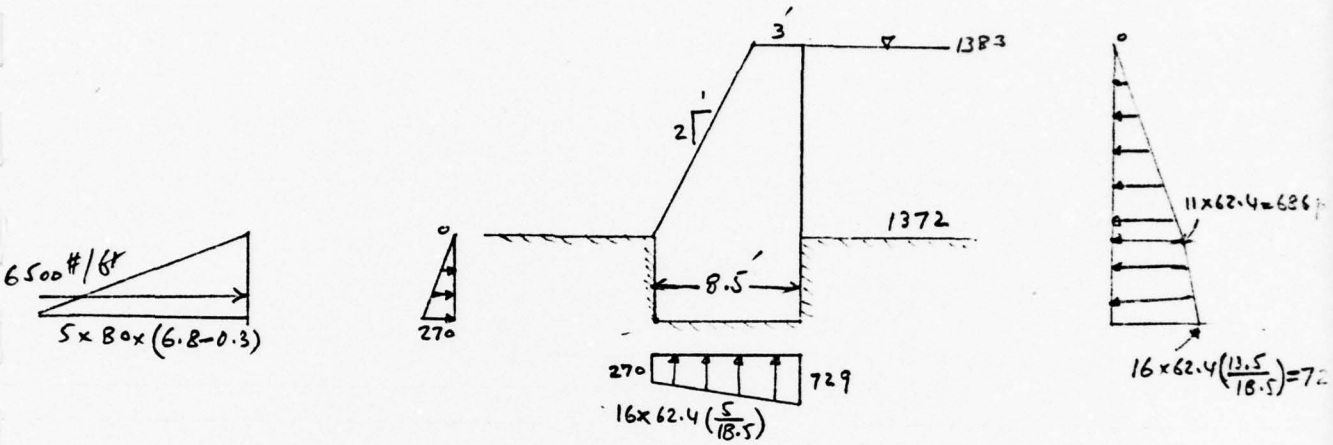
F.S. sliding $\frac{12,416(0.4)}{5100} = 0.97$ ∴ N.G.

BY J.K. DATE 9/25/78 **JOSEPH S. WARD** SHEET NO. 2 OF 2

CHKD. BY ORP DATE 9/26/78 91 ROSELAND AVE. CALDWELL, N. J. JOB NO. A7805-116

SUBJECT GRAVITY WALL STABILITY ANALYSIS

Water at El. 1383 ft.



ITEM	Force	Arm	Moment
Water Pressure above mud line	$-\frac{62.4 \times (11)^2}{2} = -3775$	$= 5 + \frac{11}{3}$ 8.67	-32717
below mud line	$-686 \times 5 = -3430$	2.5	- 8575
	$-(729-686) \times 5/2 = -107.5$	5/3	- 179
	$+270 \times 5/2 = +675$	5/3	+ 1125
Wall (from preceding sheet)	7200 4125 4538 } = 15863	7.0 5.5/2 5.5 x 2/3	+ 50,400 + 11,344 + 16,638
Uplift	$-270 \times 8.5 = 2295$ $-(729-270)\ 8.5/2 = 1951$ } 4246	4.25 8.5 x 2/3	- 9754 - 11,054
Passive (from preceding sheet)	+ 6500	5/3	+ 10,834
			+ 28062

$(15863 - 4246)\,\bar{x} = 28062$

$\therefore \bar{x} = \frac{28062}{11617} = 2.4 < \frac{8.5}{3}$ ∴ resultant of forces falls outside the middle third.

Downward forces = 15863 − 4246 = 11617

Horizontal forces = −3775 − 3430 − 107.5 + 675 + 6500 = −137.5

F.S. against sliding = $\frac{11617 \times 0.4}{137.5} = 33.8$ O.K.

APPENDIX D

PHOTOGRAPHS

FIGURE 1 LEFT GRAVITY WALL (BOAT DOCK)

FIGURE 2 DOWNSTREAM SLOPE OF LEFT GRAVITY WALL

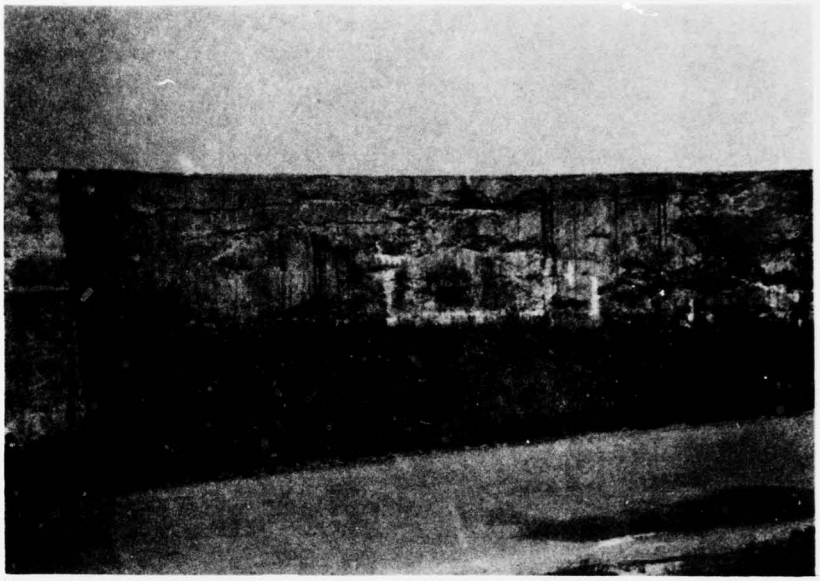


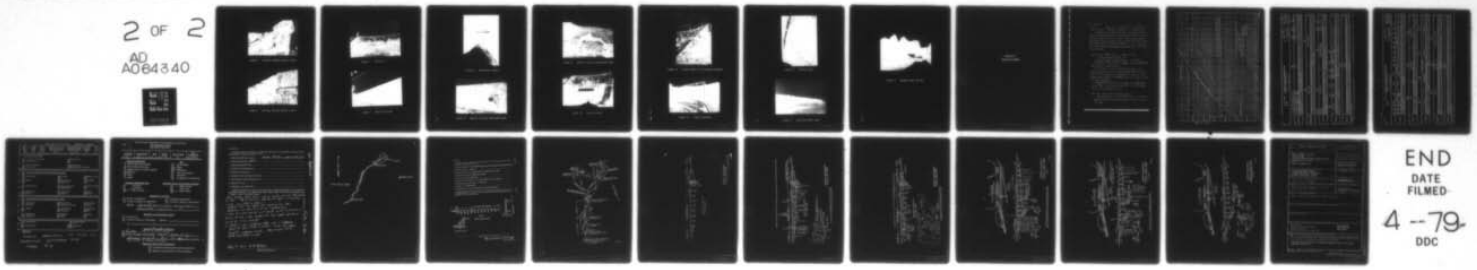
FIGURE 3 BADLY SCALED ARCH 8

FIGURE 4 SEEPAGE STREAM

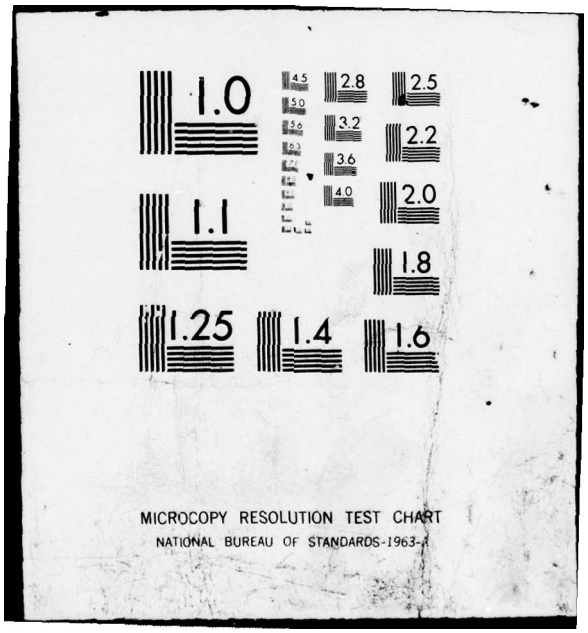
AD-A064 340 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY INSPECTION PROGRAM. PECK LAKE DAM NIAGARA M--ETC(U)
SEP 78 G S SALZMAN DACW51-78-C-0035

UNCLASSIFIED NL

2 OF 2
AD
A064340



END
DATE
FILMED
4-79
DDC


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6
6.3
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

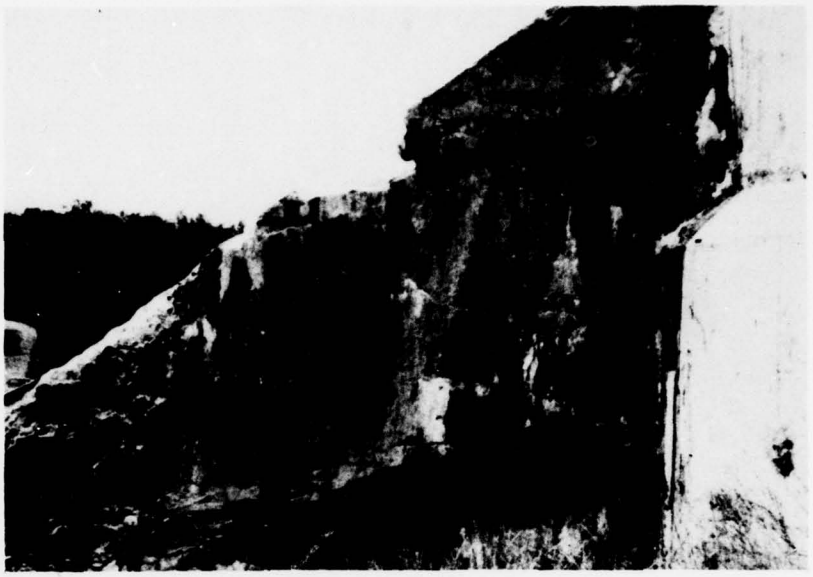


FIGURE 5 BUTTRESS BETWEEN ARCHES 7 AND 6

FIGURE 6 BUTTRESS BETWEEN ARCHES 4 AND 3

FIGURE 7 ARCH NO. 3

FIGURE 8 GRAVITY SPILLWAY

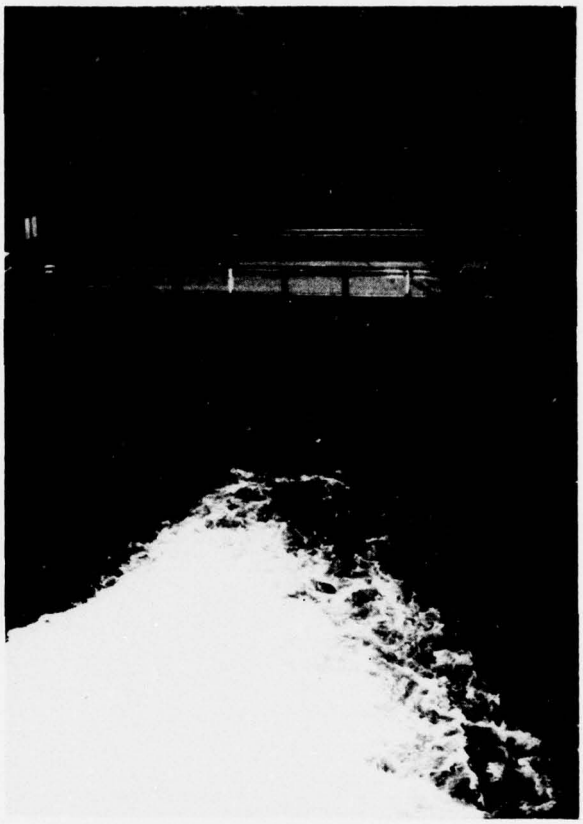


FIGURE 9 DOWNSTREAM CHANNEL

FIGURE 10 GRAVITY SPILLWAY DOWNSTREAM SLOPE

FIGURE 11 GRAVITY SPILLWAY DOWNSTREAM SLOPE

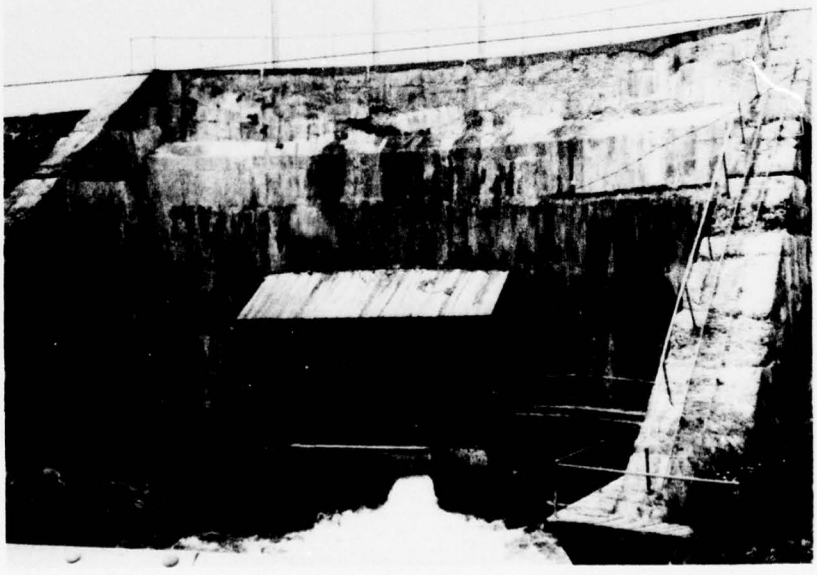


FIGURE 12 THE GATE HOUSE

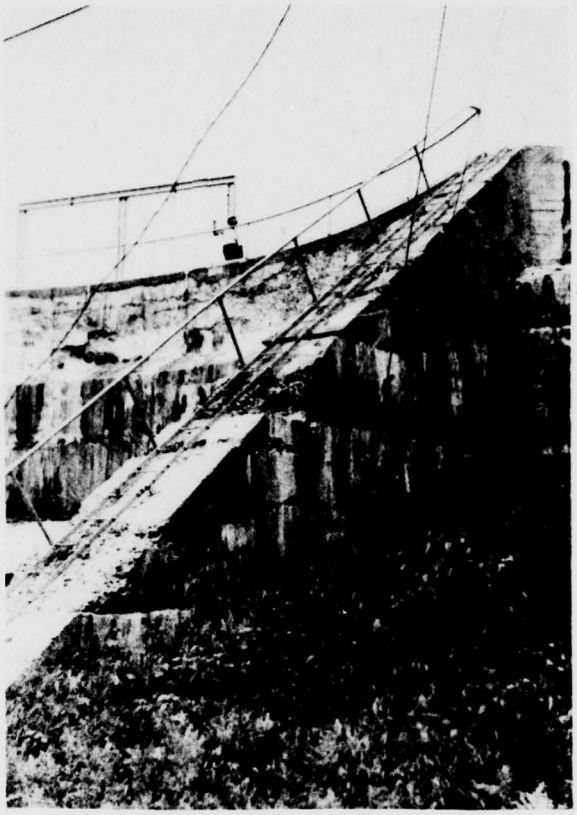


FIGURE 13 ACCESS LADDER TO THE INTAKE STRUCTURE

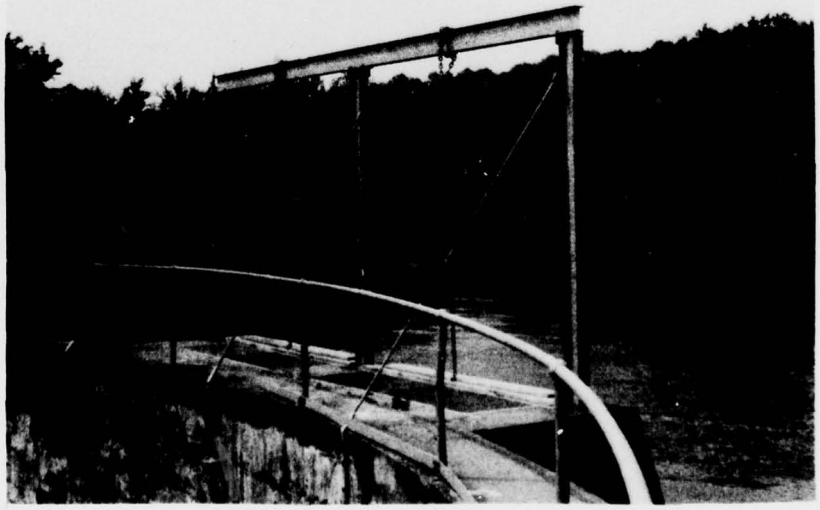


FIGURE 14 INTAKE STRUCTURE

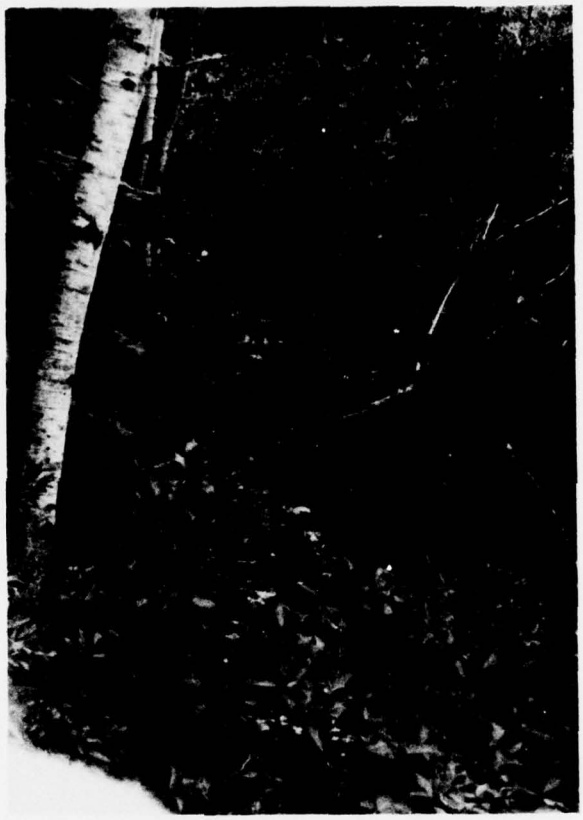


FIGURE 15 CONCRETE DIKE

FIGURE 16 RESERVOIR RIGHT SLOPE

FIGURE 17 ROADWAY ALONG THE BAY

APPENDIX E

RELATED DOCUMENTS

Deed Book [illegible]
- 21866 -

Oct 25, 1910. Mortimer Everett - Richard Hydie Everett

Parcel 178 & 179 - ~~June 3~~, 1910 Mortimer Everett - Albert T. Leeds

Will not draw water of said lake more than 2 feet below the level of the present dam, except at such times as may be necessary for repairs to said dams, dykes, flumes or controlling works; and also that it will protect the fishway to and from Leeds Lake to Leeds Creek in a manner provided by law and will screen all gateways with fish screens not exceeding one inch mesh --

June 3, 1910 Mortimer Everett - Albert T. Leeds

999 yr. lease from May 1, 1910

exclusive right, hunt, fish, boating Leeds Lake

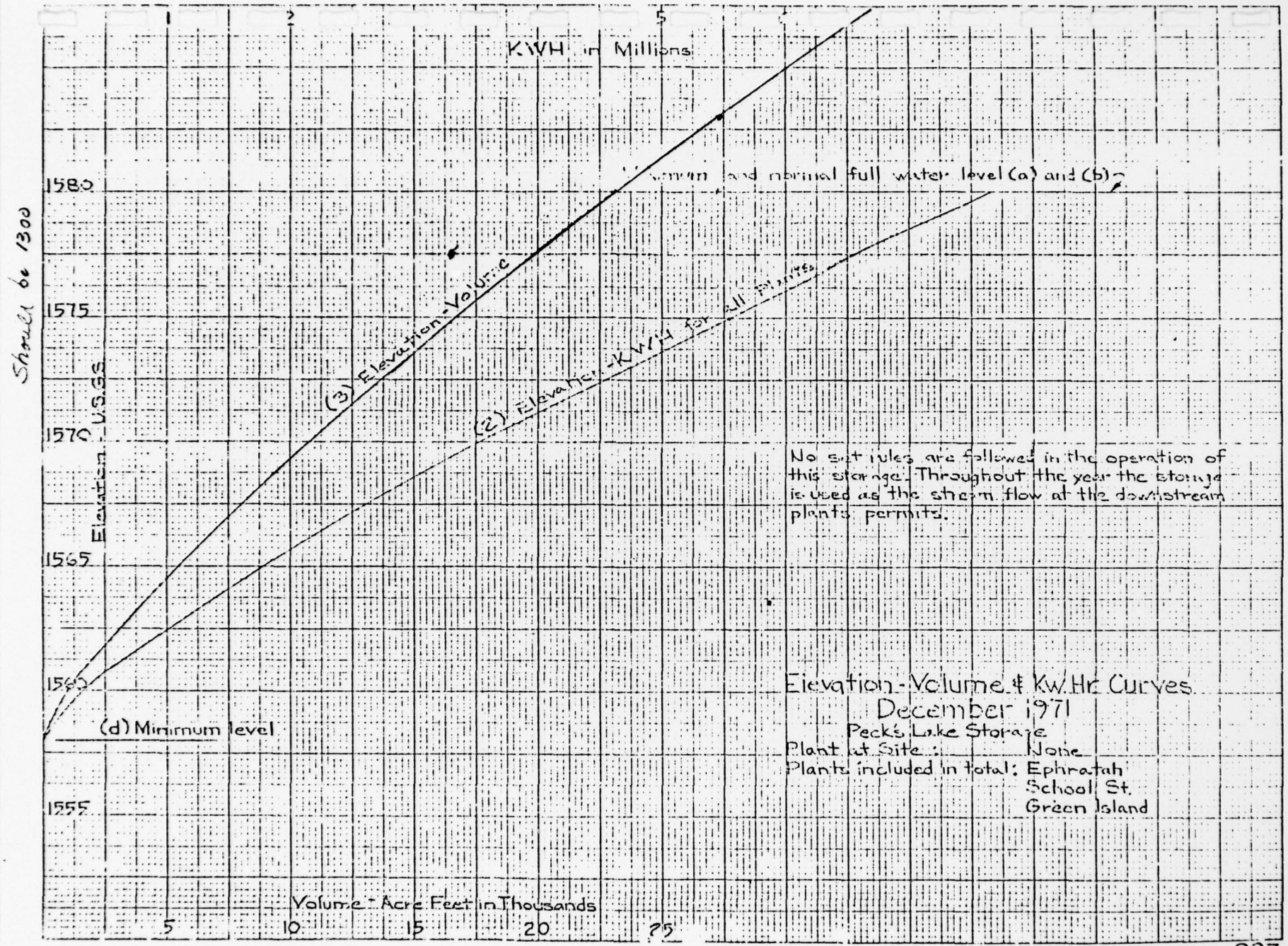
No structures to be built to interfere with operation of the dams, dykes or controlling works

Party of 1st part reserves all rights to exclude all persons from entering upon, injuring or interfering with the controlling works, dams, dykes. Reserves right at any and all times to inspect and repair of the dam, dikes, flumes and controlling works, or any other reasonable and necessary purpose.

Party of 2nd part to have, use, enjoy and control said Leeds Lake as a private park the same as he has heretofore owned and enjoyed the same.

June 3, 1910 Albert T Leeds to Mortimer Everett

Right to flow lands Leeds Lake - not to be raised by more than 2' above the level of the present dam, reservoir rights in and over the waters



...mum and normal full water level (a) and (b)

No set rules are followed in the operation of this storage. Throughout the year the storage is used as the stream flow at the downstream plants permits.

Elevation - Volume & Kw.Hr Curves
December 1971

Peck's Lake Storage

Plant at Site: None

Plants included in total: Ephratah
School St.
Green Island

PART I – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92–367)

See reverse side for instructions.

FC PPRC
OMB NO. 49–S–73001

Reports Control Symbol
DAEN–CWE–17

IDEN NUMBER: STA | NUMBER

IDENTIFICATION

(2) DIVISION	(3) STATE	(4) COUNTY	(5) CONGR DIST	(6) STATE	(7) COUNTY	(8) CONGR DIST	(9) NAME	(10) LATITUDE (North)	(11) LONGITUDE (West)	(12) REPORT DATE DAY MO YR
KA	NY	135	31				PECKS LAKE DAM	43 05	074 01 21	23 JUN 78

IDENTIFICATION (Continued)

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	PECKS LAKE

LOCATION

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY – TOWN – VILLAGE	(19) DIST FROM DAM (mi)	(20) POPULATION
2	01	PECK CREEK	WEST PARISH		12

STATISTICS

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (ft)	(25) HYDRAULIC HEIGHT (ft)	(26) IMPOUNDING CAPACITIES MAXIMUM (acre – ft.)	(27) NORMAL (acre – ft.)	BLANK
CB	1911	H	45	40		1820	3

REMARKS

(28) REMARKS
1-NO3-435 18-SCATTERED HOUSES 20-ESTIMATE

ENG FORM 4474 (ER 1110-2-104)

PART II – INVENTORY OF DAMS IN THE UNITED STATES
(PURSUANT TO PUBLIC LAW 92–367)

See reverse side for instructions.

FC PPRG
OMB NO. 49–S–7.1001

Reports Control Symbol
DAEN–CWE–17

STA | DOCK NUMBER
1 2 | 3 4 5 6 7
11 | NY

STATISTICS

(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)
D S HAZ	CREST LENGTH (ft)	SPILLWAY TYPE	SPILLWAY WIDTH (ft)	SPILLWAY MAXIMUM DISCHARGE (cfs)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NO	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)	NAVIGATION LOCKS LENGTH (ft)	NAVIGATION LOCKS WIDTH (ft)
1	954	C	250		4M150											

MISC DATA

(46)	(47)	(48)
OWNER	ENGINEERING BY	CONSTRUCTION BY
NEW YORK CITY BOARD OF ELECTRICITY		

MISC. DATA (Continued)

(49)	(50)	(51)	(52)
REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
DEC	DCC	DEC	DEC

MISC DATA (Continued)

(53)	(54)	(55)
INSPECTION BY	INSPECTION DATE DAY MO YR	AUTHORITY FOR INSPECTION
DEC	18 SEP 70	ENCOM LAW 85-500

REMARKS

(56)
REMARKS
1-03-425

ENG FORM 4474A (ER 1110-2-104)

DNR DAM INSPECTION REPORT PECK'S LAKE

RG	CTY	YR AP.	DAM NO.	INS. DATE	USE	TYPE
23	18	11	00435	1609 79	024	4

AS BUILT INSPECTION

1	Location of Sp'way and outlet	1	Elevations
1	Size of Sp'way and Outlet	1	Geometry of Non-overflow section

GENERAL CONDITION OF NON-OVERFLOW SECTION

1

1	Settlement	2	Cracks	2	Deflections
2	Joints	2	Surface of Concrete	1	Leakage
1	Undermining	1	Settlement of Embankment	1	Crest of Dam
2	Downstream Slope	1	Upstream Slope	2	Toe of Slope

GENERAL COND. OF SP'WAY AND OUTLET WORKS

1

1	Auxiliary Spillway	2	Service or Concrete Sp'way	1	Stilling Basin
2	Joints	2	Surface of Concrete	2	Spillway Toe
1	Mechanical Equipment	4	Plunge Pool	1	Drain

1	Maintenance	C	Hazard Class
3	Evaluation	34	Inspector

COMMENTS:

GUNITE OPERATION AT TIME OF INSPECTION UPSTREAM ONLY

OWNER N. M.

(7/76)

New York State Department of Environmental Conservation

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
435	Mohawk	Johnstown	Fulton	C	9/22/76

Type of Construction

- ☐ Earth w/concrete spillway
- ☐ Earth w/drop inlet pipe
- ☐ Earth w/stone or riprap spillway
- ☑ Concrete
- ☐ Stone
- ☐ Timber

Use

- ☐ Water Supply
- ☑ Power
- ☑ Recreation
- ☐ Fish and Wildlife
- ☐ Farm Pond
- ☐ No Apparent Use-Abandoned

Estimated Impoundment Size

- ☐ 1-5 acres
- ☐ 5-10 acres
- ☑ Over 10 acres

Estimated Height of Dam above Streambed

- ☐ Under 10 feet
- ☐ 10-25 feet
- ☑ Over 25 feet

Condition of Spillway

- ☐ Service satisfactory
- ☐ In need of repair or maintenance
- ☐ Auxiliary satisfactory
- ☐ In need of repair or maintenance

Explain: Sinnock Rock Dam Going Into Structural - injection

Condition of Non-Overflow Section

- ☐ Satisfactory
- ☐ In need of repair or maintenance Explain: "

Condition of Mechanical Equipment

- ☐ Satisfactory
- ☑ In need of repair or maintenance Explain: Owned by Niagara Mohawk - Park has 999 year lease on lake & shore property

Evaluation (From Visual Inspection)

- ☐ No defects observed beyond normal maintenance
- ☐ Repairs required beyond normal maintenance

18-20-11-3000 (16-10-52)

Fill out a form as complete as possible for each dam in your district and send to State Conservation Commission, Albany, N. Y.

435 Mathauk

1. Name and address of owners Assistant Christian in charge 25 May 1919
2. Date of construction 1911
3. Uses of impounded water
4. Character of foundation bed
5. Material of waste spill
6. Length of waste and depth below dam
7. Total length of dam including waste
8. Material of dam
9. Discharges, size and location

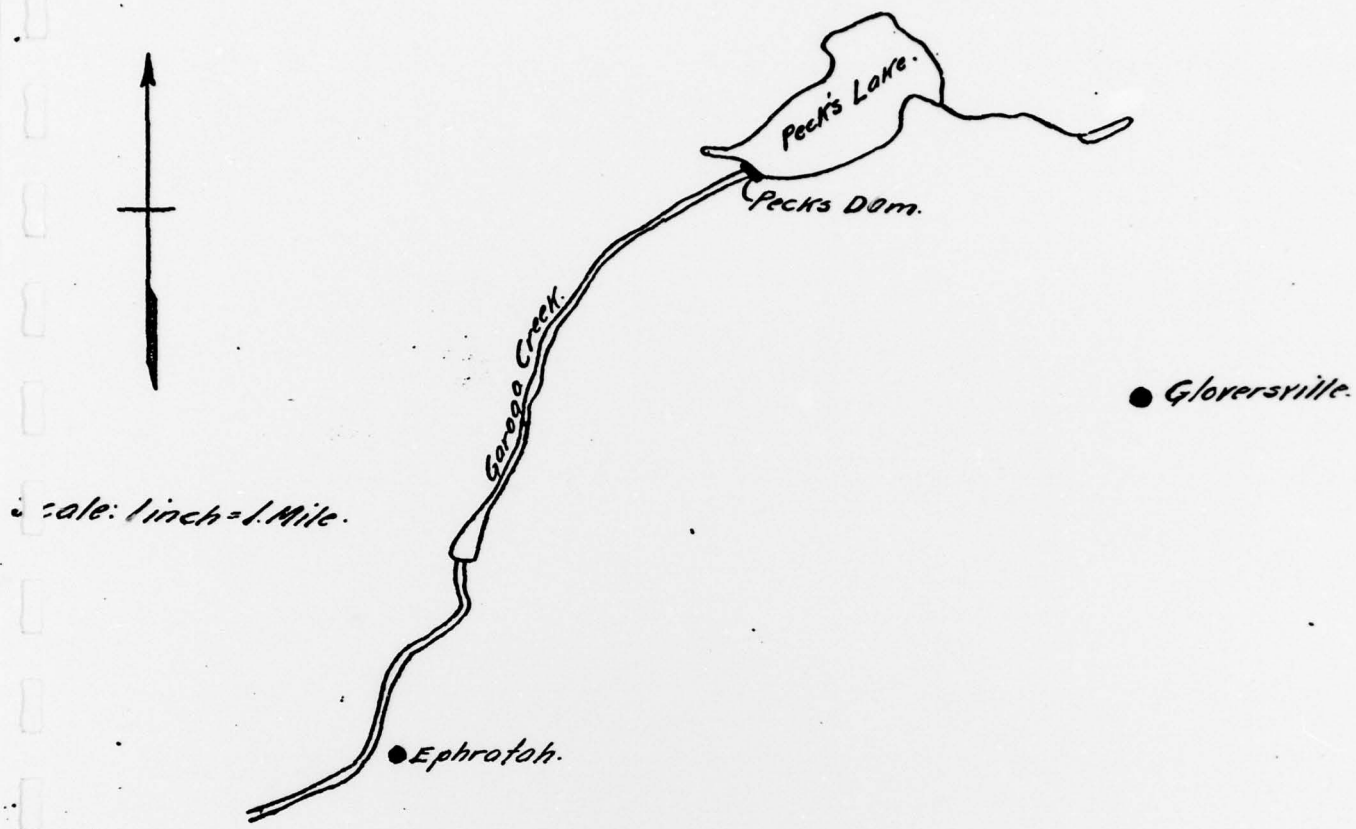
Below sketch section of waste and section of dam, with greatest heights and top thickness and bottom thickness. On opposite side sketch general plan of dam and give distance from a bridge or from a tributary stream.

Nearest town Pecks Lake

Lower half on down stream side of arches considerably coated
with lime. Top 7½" finish on top pealed off in many cases.
Creek generally as called.
Leakage water over spill 16", both gates open.
Buttresses run down 12' & 24 ft to gland base.
Section X X about 400 ft and 400 ft earth embankment
beyond, 8' wide on top - slopes 1:2 rip rapped up stream -
end 6 ft max. heights.
1 - Arch #1 - four leaks at bolts and 2 at joints.
Arch #2 - four leaks. 2 at bolts. 1 under some head.
Arch #4 seepage under. Also arches 7 & 8.
Water 5 ft below crest.

Sept 7 - 1915 A R McK'an.

(Signature, address and date.)


Peck's Lake.
Pecks Dam.
Garoga Creek.
Gloversville.
Scale: 1 inch = 1 Mile.
Ephrotah.

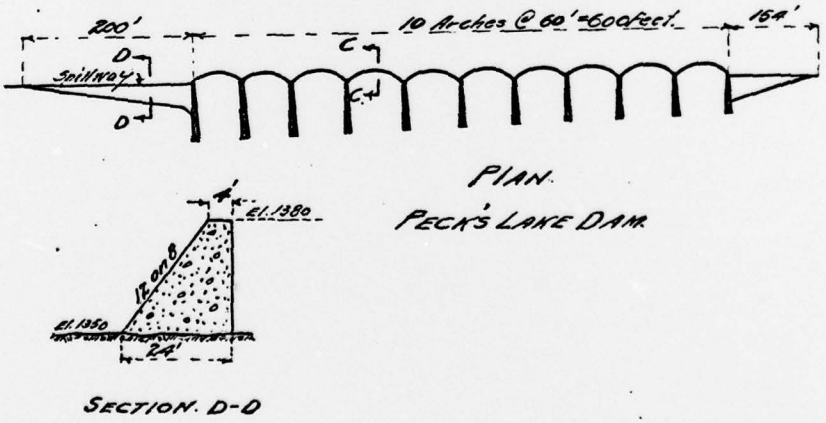
.435.

13-30-11-3000 (16-10-52)

Fill out a form as complete as possible for each dam in your district and send to State Conservation Commission, Albany, N. Y.

1. Name and address of owners Mohawk Hydro-Electric Company. 60 Wall St New York
2. Date of construction 1910-11.
3. Uses of impounded water for generation of electric current
4. Character of foundation bed Hardpan & Rock
5. Material of waste spill Concrete
6. Length of waste and depth below dam 200 Feet Waste, 3 Ft depth
7. Total length of dam including waste 954 Feet.
8. Material of dam Concrete
9. Discharges, size and location 2-36" Pipes 36.6 feet below Crest.

Below sketch section of waste and section of dam, with greatest heights and top thickness and bottom thickness. On opposite side sketch general plan of dam and give distance from a bridge or from a tributary stream.

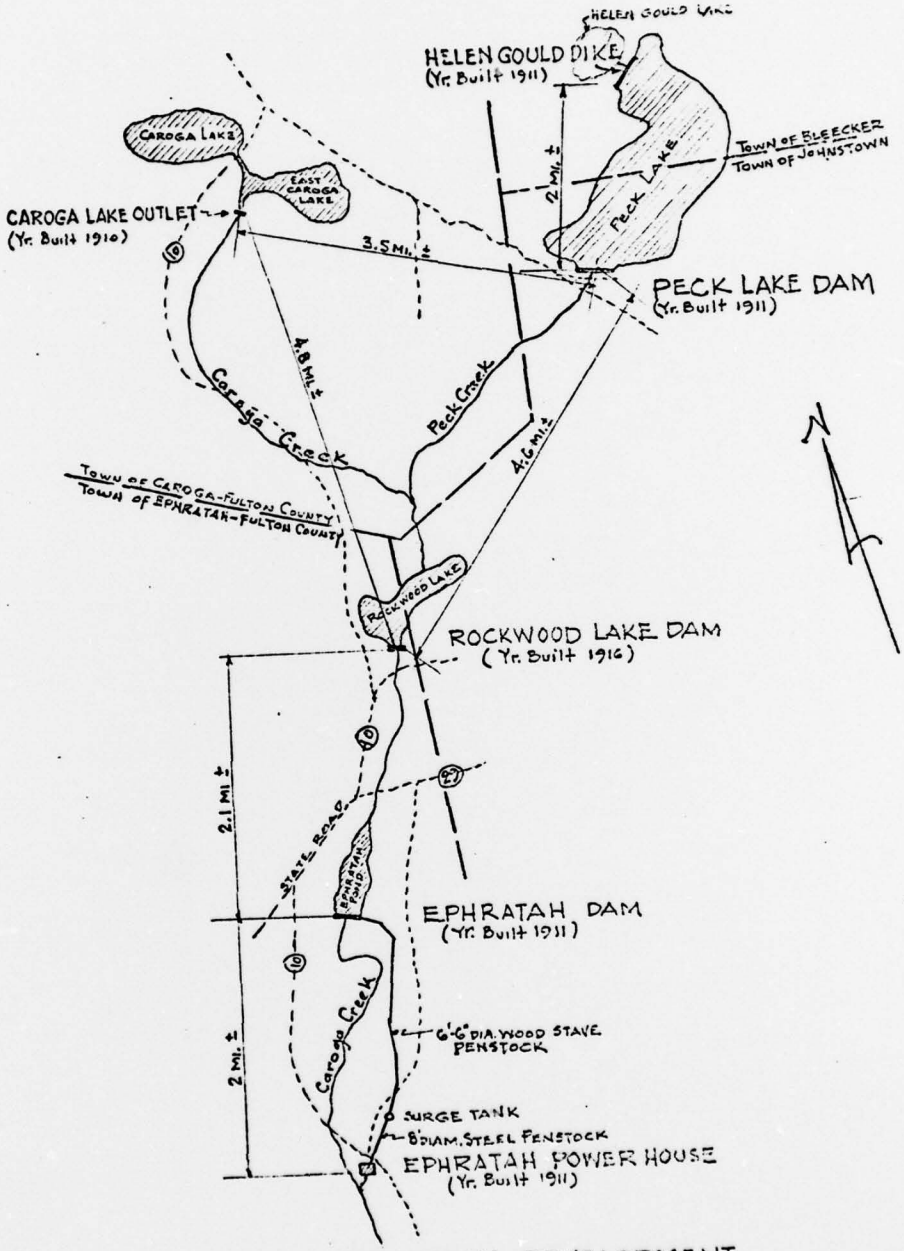


PECK'S LAKE DAM

Nearest town Ephratah

(Signature, address and date.)

Barclay Thomas T. Clapp
Conservation Comm.

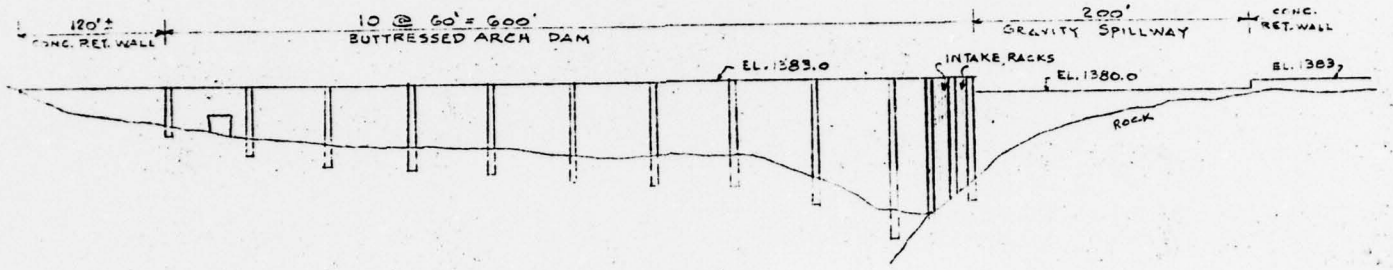


EPHRATAH DEVELOPMENT

GENERAL LOCATION MAP

NO SCALE

8-7-68



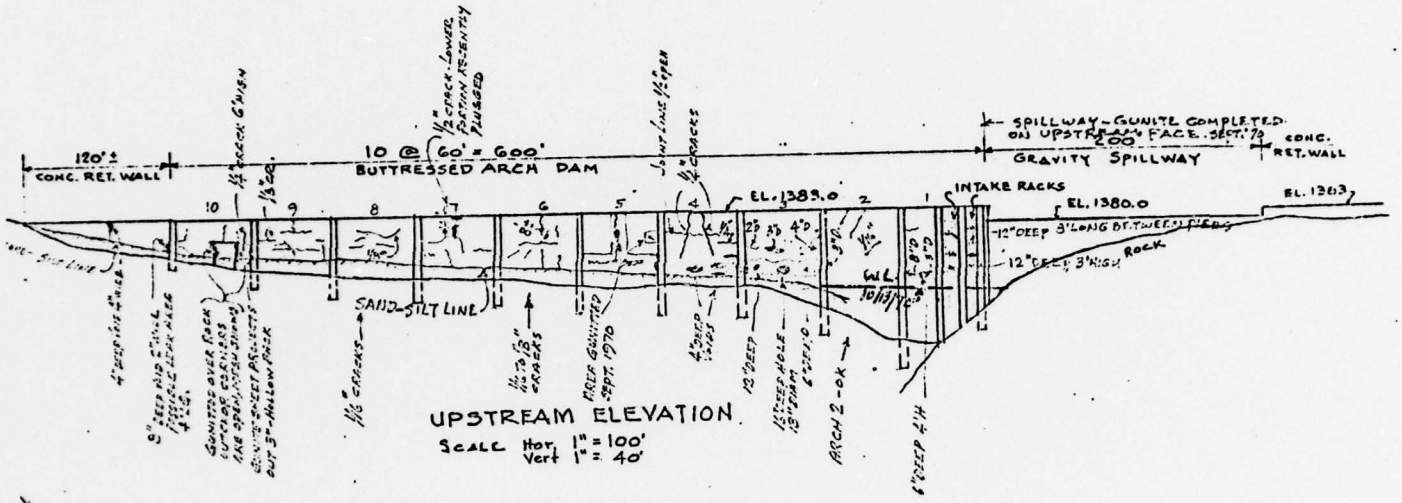
UPSTREAM ELEVATION

Scale Hor. 1" = 100'
Vert 1" = 40'

EPHRATAH DEVELOPMENT

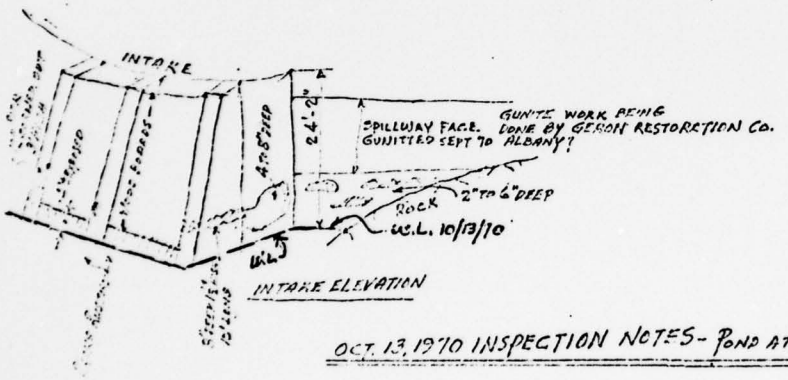
PECK LAKE DAM

UPSTREAM FACE OF ARCHES 10, 9, 8, 7, 6, 5, 2 & PART OF 1 WERE ORIGINALLY GUNITTED IN NOV. 1930 - FROM TOP DOWN TO 20½ FT.



UPSTREAM ELEVATION

Scale Hor. 1" = 100'
Vert 1" = 40'

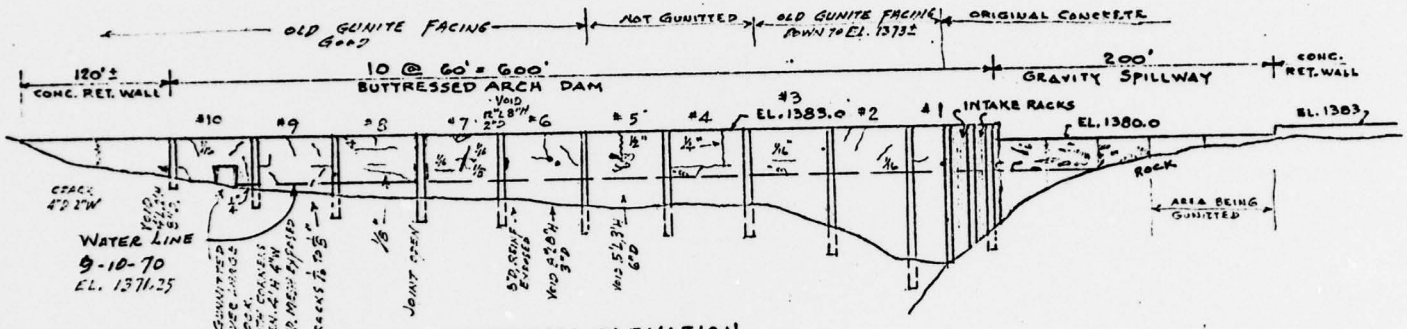


INTAKE ELEVATION

EPHRATAH DEVELOPMENT

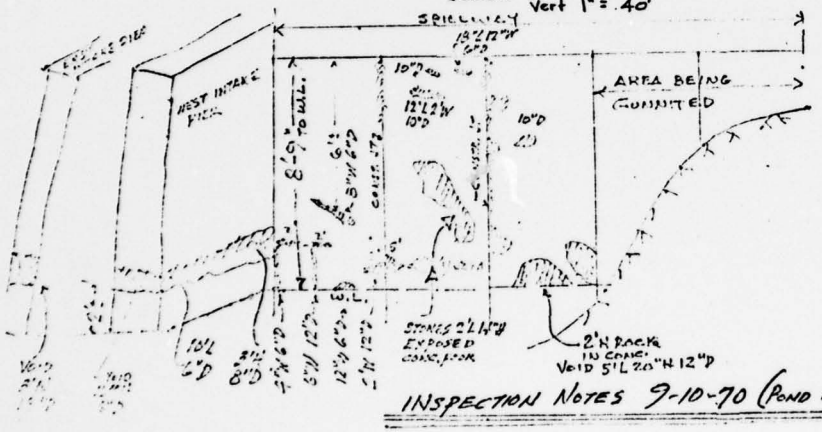
PECK LAKE DAM

OCT. 13, 1970 INSPECTION NOTES - POND AT EL. 1359±



UPSTREAM ELEVATION.

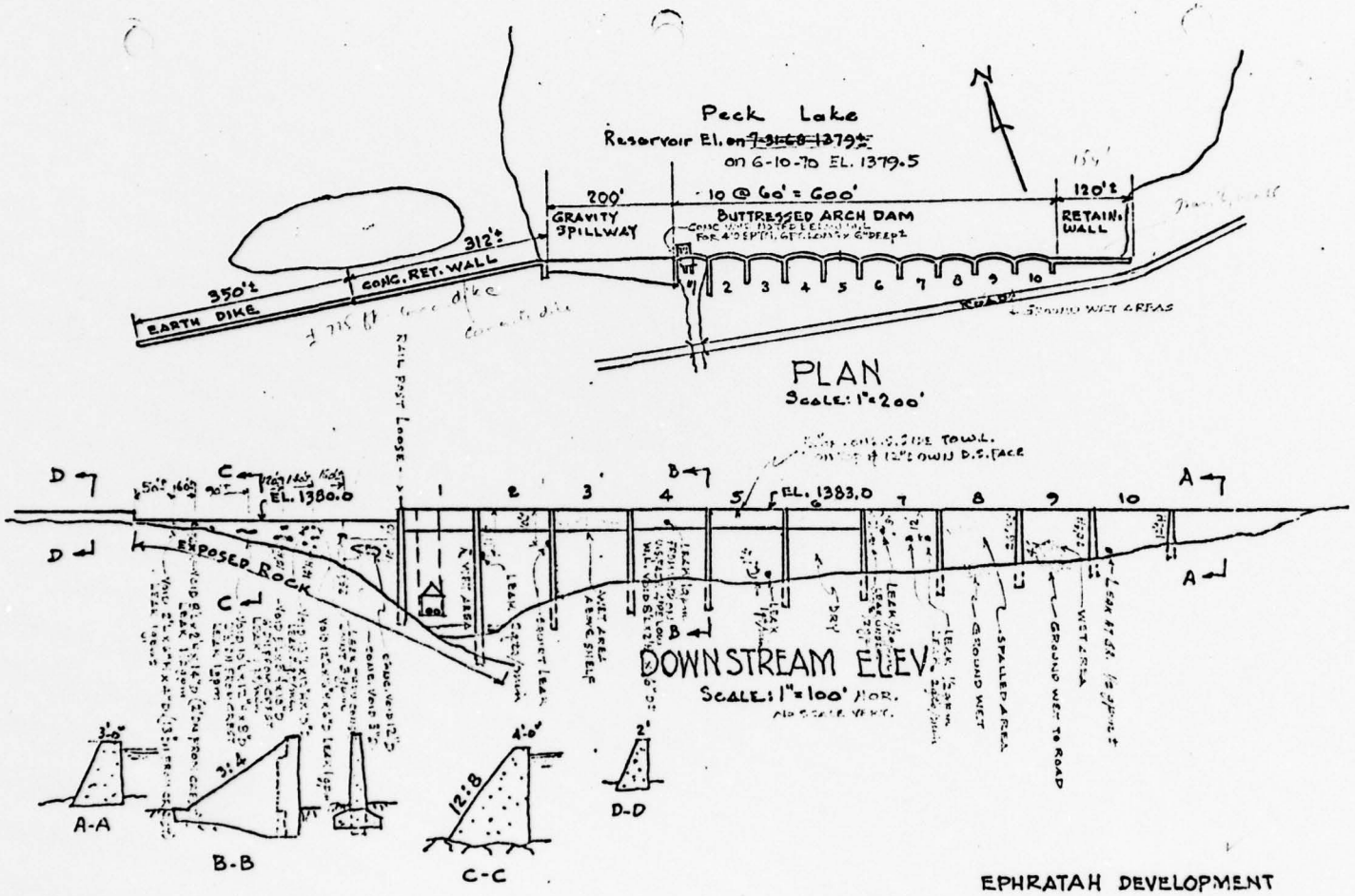
Scale Hor. 1" = 100'
Vert 1" = 40'



EPHRATAH DEVELOPMENT

PECK LAKE DAM

INSPECTION NOTES 9-10-70 (POND AT EL. 1371±)



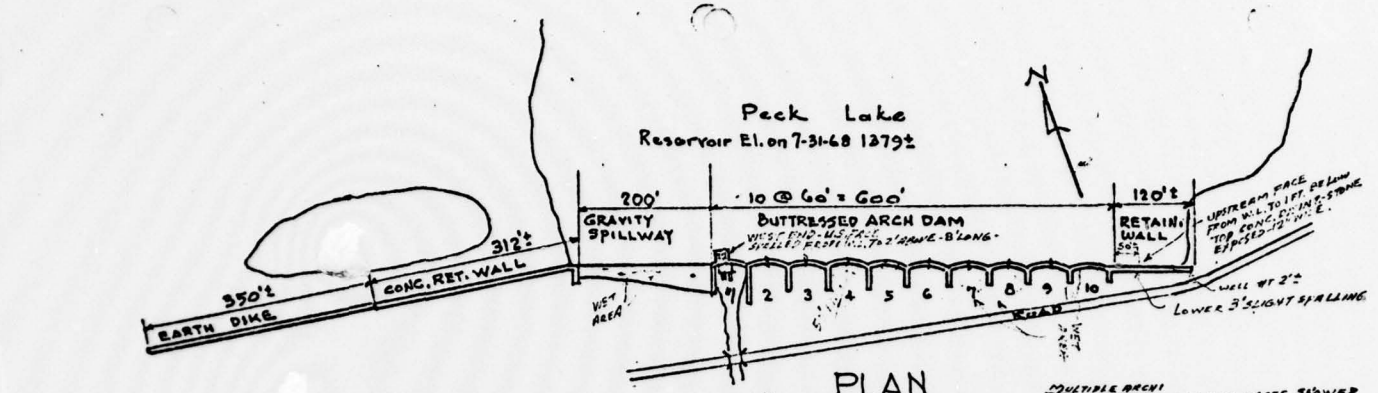
EPHRATAH DEVELOPMENT

PECK LAKE DAM

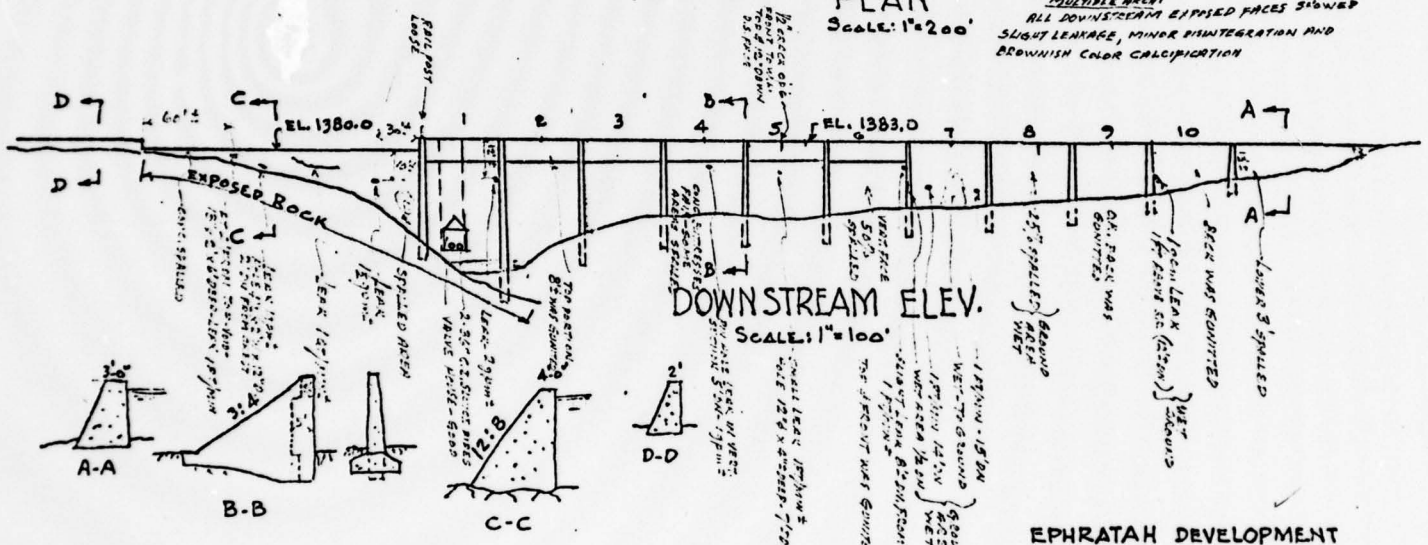
YR. 1911

JUNE 10, 1970 INSPECTION — Water Elev 6"± Below Spillway Crest

8-1-68



MULTIPLE ARCH!
ALL DOWNSTREAM EXPOSED FACES SHOWED SLIGHT LEAKAGE, MINOR DISINTEGRATION AND BROWNISH COLOR CALCIPICATION



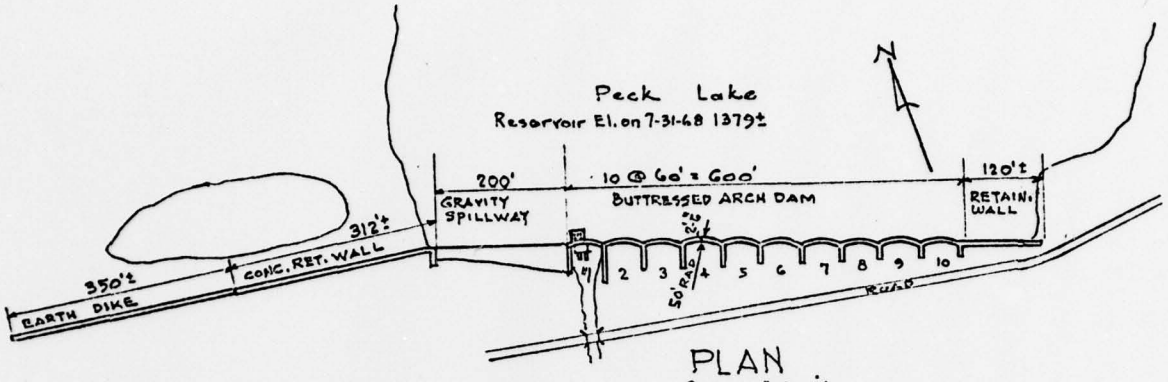
EPHRATAH DEVELOPMENT

PECK LAKE DAM

YR. 1911

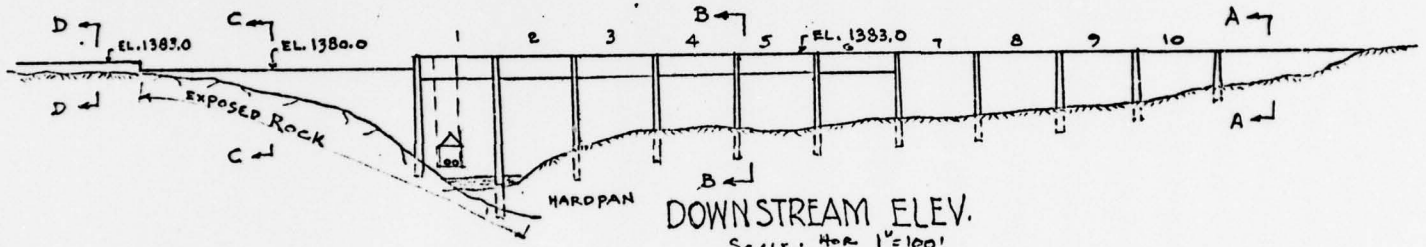
7/31/68 INSPECTION - POND ELEV. 12"± BELOW SPILLWAY CREST.

8-1-68



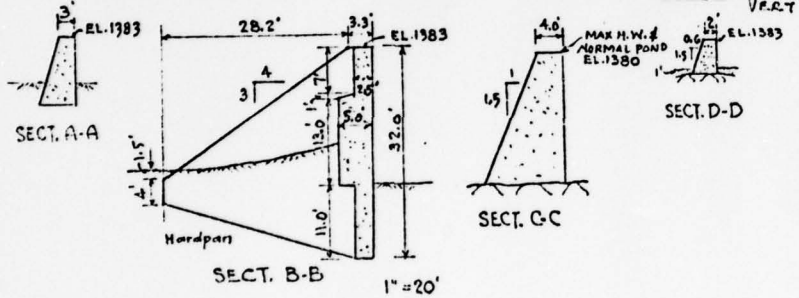
PLAN

Scale: 1"=200'



DOWNSTREAM ELEV.

Scale: Hor 1"=100'
Vert 1"=40'



EPHRATAH DEVELOPMENT

PECK LAKE DAM

YR. 1911

8-1-68

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Phase I Inspection Report
Peck Lake Dam
Peck Creek Basin, Fulton County, New York
Inventory No. N.Y. 166

5. TYPE OF REPORT & PERIOD COVERED
Phase I Inspection Report
National Dam Safety Program

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
Gary S. Salzman, P.E.

8. CONTRACT OR GRANT NUMBER(s)
DACW51-78-C-0035

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Converse-Ward-Davis-Dixon
91 Roseland Avenue / P.O. Box 91
Caldwell, New Jersey 07006

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11. CONTROLLING OFFICE NAME AND ADDRESS
New York State Department of Environmental Conservation / 50 Wolf Road
Albany, New York 12233

12. REPORT DATE
29 September 1978

13. NUMBER OF PAGES

14. MONITORING AGENCY NAME & ADDRESS (If different from Controlling Office)
Department of the Army
26 Federal Plaza / New York District, CofE
New York, New York 10007

15. SECURITY CLASS. (of this report)
UNCLASSIFIED

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Fulton County
Peck Lake Dam
Peck Creek

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Peck Lake Dam was judged to be unsafe-non-emergency due to a seriously inadequate spillway.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)